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STEBBINS, R.C.

January 7 - February 27, 1963

1. Asian trip

Journal and Species Accounts

1.
STEBBINS, R.C.

January 7, - February 27, 1963

Asian trip
Journal
and
Species Accounts

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Asian Trip

Jan. 7 San Francisco to Washington

9:30 am. On way to south & southeast Asia with Dr. Francis Dart to introduce guidelines to laboratory science in secondary schools.

Project sponsored by National Acad. Sci.

TWA flight 64 - departure time 9:15 am. Clear bright morning. Fog bank in delta area. Flight NE to Sacramento.

9:32 am. Over Sierra foothills. Sierra cloudless! Looks like fog extends S into San Joaquin Valley.

9:45 am. Over Lake Tahoe. Surprisingly light snow fall at crest of Sierra. Lakes, ponds, streams glistening in many places. Could see Mount Shasta - solid snow cover. Flying at 33,000 ft. Smooth so far.

9:50 am. Over Great Basin. It's going to take more than water to make this a productive agricultural area. ^{Ice} Frozen water everywhere. The growing season is short. Another deterrent - alkali impregnated soil - ⁱⁿ the flat areas most suitable for farming.

10:30 am. Crossed south end Salt Lake. Light ground fog but only few wisps of clouds.

10:55 am. Cold snow-dusted wind swept eroded terraces below. Nearing eastern slope of Rockies. Clear. Wisps of clouds. Only 8 people 1st class (28 seats). Can

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San Francisco to Washington

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move about freely. Strip farming pattern at E edge of Rockies - also strip cutting of timber. Haystacks in center of large fields; one stack to field. Extensive snow mantle. Strip fresh cutting in lower areas.

11:05 a.m. Leaving eastern escarpment of Rockies.

Strip farming pattern building up in amount - plots in lower, less eroded areas. We have learned a lesson from the Dust Bowl of the 1940's. Strips are N-S oriented; prevailing winds then must be E-W. Less snow now. Thin patches here & there. Some strips EW & diagonal.

12:15 p.m. Began solid cloud cover - like a great expanse of snow. Rough spots here & there - updrafts?

12:40 p.m. Turned somewhat SE. Still cloudy below. Not a hole anywhere.

1:25 p.m. Began letting down. Solid cloud cover.

1:35 p.m. Announced descent to Dulles Airport. - temp there 38°F

1:55 p.m. (4:53 p.m. eastern time) - landed Dulles Airport. Plenty of snow. Country-side of white fields & broad leaf forest. Forest leafless & from high altitude looked like coarse hair. Plush bus (red carpet) took us from plane to terminal. Buses 12-15' high, tires 4' across, air conditioned. Drove up to stall at terminal. No exposure

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Washington, D.C.

Jan. 7 Solves space problem posed by jets; avoids risk of old people slipping on icy surfaces.

Met a Mr. Abe Kramer, Labor Attache, U.S. Embassy, Singapore, on airport bus. Had spent 20 mo. in S.E. Asia. Returning for physical check up. Has leucemia - perhaps only 2-3 yrs. to live. Told me some of do's & don't's in Asia. Said it would be well for us to contact Peace Corp people. Kramer says - he yourself - no shame. Their attitude will be that there's is an ancient culture - why should they listen to west - yet they actually do envy advances of west.

8:00 pm. (EST) Brief visit with Dr. Tryggen ^{Head Office of Sci. Personnel} at his office for plans for tomorrow. We walked to his office from Roger Smith Hotel - about $\frac{1}{2}$ mile. Air cold - ears & nose chilled but otherwise comfortable. Three inches of snow on lawns, etc. Streets clear. Stopped for look at White House, on Pennsylvania St. Street grid in central Washington consists of numbered streets one way & lettered streets another (at rt angles) & diagonals usually named after a state. Washington Monument fully illuminated. Not hard to see why it results

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Jan. 7 Washington. in bring^{ing} about demise of birds.
Appointments for tomorrow: 9:00 a.m. - Joe
Boyce, Advisory Board on Education; (Bob Green
arranged appt.)
11:00 a.m. Brig. Gen. Willard Webb, 601
Mills Bldg., 704-17th St., N.W.;
2:30 p.m. Mr. Kretzmann, Deputy Director,
Office of International Affairs, Dept. of
State (Appt. made by Mr. Murray Todd,
OFS).

Jan. 8 Brig. Gen. Willard Webb, Amer. Science
Film Association told us of film festival
to be held in India. Science films will
be shown on following dates: Jan. 14 -
New Delhi, Jan. 21 - Madras, Jan. 28 -
Bombay, and Feb. 4, Calcutta.
Commander Ed. Bird is administering
program. Mike Fisher (USIS) of U.S.
Embassy - Public Affairs division asked
ASFA to set up festival.

Topics to be covered - American Scientists
involved in films & film-making, Medical
subject matter, Science Teaching,
popular science such as pineapple
production in Hawaii.

Showings will run 90 min. Webb
as arranged selection. Over for Webb's
address

#4a

Brig. Gen. Willard Webb

601 Mills Bldg.

704-17th St., N.W.

Tel: 393 3818 or 3819 .

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Pakistan Commission on National Education
(Formed 1958)

S. M. Sharif (Chairman)	A. F. Atwar Hussain
M. Razuddin Siddiqi	Mumtazuddin Ahmed
M. K. Afridi	B. A. Hashmi
S. Hamid Shah.	R. M. Ewing
A. F. M. Abdul Haq	M. A. Rashid.

p. 17, item 14 of Report of above Commission:

"The commission recognizes that the methods now employed in our colleges and universities are unsatisfactory in that they emphasise memorisation of facts to the exclusion of other kinds of learning. These must be replaced by teaching methods which will excite the student's intellectual interest and generate in him a spirit of enquiry and the ability to apply his knowledge to the solution of his problems."

Matriculation after 10 yrs. Commission feels there should have 2 yrs. Intermediate stage training before university. Students then 17-19 yrs. old & mature.

Report of the Curriculum Committee
for Secondary Education (Classes VI-XII)
Taj Muhammad Khayal.

Not studied by me.

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Washington

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Webb would like our opinion of audience reaction, whether we think program helpful to cause of U.S. science, selection of subject matter — proper balance? He would also like suggestions on U.S. science films that might be considered by his office.

He urged me to write the "Card Division", Library of Congress for carding of my film, "Nature Next Door", if the film has not been recorded. I must ask the Sierra Club to send him the film and accompanying brochure for review.

Webb suggested we contact Mrs. N.E. Brigham, wife of the Advisor on Science Education ~~and~~ who is travelling with a Columbia Univ. party of advisors on education (under USAID program).

She is an elementary school teacher (5th & 6th grade) involved in science programs for T.V.

Webb said UNESCO evaluation & availability data indicate accessions in films ran over 4000 last year & the grand total is something like 45000 (if I remember correctly).

Boalotin & Walter Auffenberg will be at the conference in New Delhi.

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Washington

Jan. 8

Visited Mr. Kretzmann in the State Dept. He is Deputy Director, Office of International Affairs, Dept. of State. He made suggestions on contacts along our way. CENTO countries have been holding a conference on the teaching of science. On behalf of the CENTO conference, Wm. W. Abbe & Kenneth Clem made recommendations to Pakistan on teaching of science.

Salimuzzaman Siddiqui, Pakistan Council of Science and Industrial Research. Chairman of the National Science Foundation.

Bombay - Nuclear Science Hqts. At consulate - Council General Melton C. Rawlins. At Science Center - Sidney Sober - involved in repatriating.

New Delhi - Lane Timmons (no. 2 man). Deputy Chief of mission. No. 1 man is Ambassador Galbraith (J. Kenneth). Berry Zorthen also mentioned. Foreign aid man C. Tyler Wood.

Calcutta - Ralph Segman - Assistant in Information.

Bangkok - Kenneth Young - Ambassador. Alfred Puhar, no. 2 man. Mention to him that Kretzmann sent us

Kuala Lumpur - Charles Baldwin ambassador.

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Washington

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Taiwan. Admiral Kirk. Ralph Clough - no. 2 man. Kretzman knew him well. A colonel in Kretzman's office (has been stationed in far east) pointed out that much U.S. educational equipment is gathering dust. Microscopes sit unused. Prestige factor in Asian education. One does what is necessary to get status. Little interest in science for its own sake. We were urged to keep our eyes open for Asians we think would benefit from U.S. experience and who would then return to their respective countries to further science education.

While at Kretzman's office we had opportunity to hear of the experience of ^(researcher) Walter Hodge and ^(educator) Howard Forcannon, who had visited the CENTO countries under NSF sponsorship. Their mission had been to make recommendations on the agenda for a forthcoming summer conference (next June) on secondary school science. They spent about 1 week in each CENTO country - Turkey, Iran, Pakistan. They picked the brains of the scientists and visited ministries of Education. Six persons were to be picked from each country to attend the conference - a mathematician, chemist, physicist, biologist, the Minister of Education, and a Science Council member.

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They did not actually visit any secondary schools. The agenda they proposed for the conference was as follows:

To be considered —

I. Matters of National Policy.

a. Science and economic development
(these must be related)

b. Decoding type science instead of rote memory.

Speakers to come from Great Britain and U.S.

II. Curriculum

a. Course content — subject matter

b. Training aids. Exhibits to be arranged.

III. Teacher training

a. Process

b. Success

Hodges and Foncannon to be followed in February by 4 U.S. scientists and a representative from each CENTO nation who will follow up preliminary plans.

Dr. Wm. Morrell to evaluate programs of summer institutes for college teachers in Pakistan. He is from the Asia Foundation.

Art Campbell may study science

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curriculum in Pakistan. There have been substantial terms in education ministry analyses and recommendations on secondary education by the Ministry of Education.

Siddique and an education are conducting big summer program. This coming summer. 125 ± teachers of science will attend.

S. H. Sharif, key man in the Ministry of Education in Pakistan roundly criticized recommendations of high level team, formed through stimulus from Taylor Johnson.

Inpractical - on closed 9.

Bangkok contact - Pradith Chemsakul Secretary General Sci Soc Thailand. Biol Bldg., Chulalongkorn Univ., Phayathai Rd., Bangkok, Thailand. He welcomes us to meet high school science teachers.

Met Joe Boyce, Advisory Board on Education, National Acad. Sci.

Jan. 9

Spent about 1 1/2 hours with Dick Paulsen and Charles Whitman, and a Mr. Magee discussing our ESSP project.

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Academy

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Washington

Jan. 9 Letter in my file this date covers the
queries. It is clear we must pay
scientists to work on project. They must
feel committed to produce. It is
also evident we must have a
controlling director and separate
advisory or policy committee and
project.

Left for National Airport about 12:32 pm.
Clearing weather, snow melting off
somewhat. Saw flock of coast wrens,
juncos and jays on road partly
covered with ice.

Flew to New York on National Airlines
Flight 206. Left at 1:30 pm. Arrived
at Idlewild at around 2:30 pm.
Frank Dart went into New York to get
our visas & passport, returning around
6:00 pm. Bob and Sam Wilcox
came out and saw us off. We
had dinner together in the posh
Pantheon building. We left on Pan
Am. Flight 2 at 8:15 pm for
London.

Jan. 10

Mostly a smooth flight at 33000 ft.
Full moon, snow-like cloud cover below.
As we cross west coast of Ireland,
a red dawn. Our plane is fully

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London - Frankfurt

Jan. 10 loaded - probably 125 passengers. Venus (?) shining brightly in eastern sky. Arrived at London airport 7:45 a.m. Air temp., according to captain, 28°. We could believe it! Much snow. After 50 minute stop, on to Frankfurt. Flight plan announced in English, French, German, and some near eastern language (?). Only animal life seen were flocks of gulls over London airport, one group in straggling V-formation.

9:15 a.m. Reached European mainland. Belgium in a deep freeze. From our altitude, 22,000', it looks like a great frozen ice flow - the patchwork of farms like blocks of ice. The sun glinted on the frozen ground. There is almost nothing but cultivated lands near the coast. Only narrow hedge rows separate the fields. A thin cloud cover with many openings far below.

9:25 a.m. We now have a solid cloud cover below us, completely hiding the ground and the flight is a little rough. The sun is shining brightly 30° to right of our line of flight.

9:28 a.m. Now there are rents in the clouds and the ground can be seen - dark patches of hilltop forests with white snow covered

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London to Frankfurt

Jan. 10 valleys

9:30 a.m. Percentage of forest lands about 25%.
Much broken up. Implications for wildlife,
particularly larger forms?

9:35 a.m. Countryside covered with heavy snow.
Forests hoary. Another extensive cloud bank
is looming.

9:40 a.m. Putting on brakes & starting down.
Interesting shadows from high strings
of cloud on solid cloud can below.

Time
change

Came down through overcast.
Haze below but can see 1 mi (?) over
Landed on snow covered airport at
11:45 a.m., ~~Munich~~ Frankfurt time.
Temp. 26 °C. Required to carry hand
luggage to terminal for customs check.
Wandered around lobby looking
at German cameras, paper books,
jewelry, etc. Take off delayed by
spilled fuel below plane which had
to be covered with sawdust. It was
interesting to hear German spoken
again after about 5 years.

Lost about 35 minutes. Took off
at 12:20 p.m. Broke out into bright
sun over beautiful white sea of clouds
at 12:25 p.m., headed for Munich.
Saw snow-like birds at airport.

Forest trees by the Frankfurt airport recalled my previous visit to Germany in 1958. They stood in formal rows with bare trunks and small crown. Evidently the lower branches are systematically removed for firewood.

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Jan. 10

Frankfurt to Munich

12:00 noon. Came down through heavy overcast. Ceiling perhaps 500 - 1000 ft. but plane ^{zeroed} in on runway in good style. Trees at $\frac{1}{4}$ mi. only dimly visible. Perhaps a foot of snow. Transient passengers requested to stay ~~aboard~~ aboard since we had lost time. Temp. 23° .

1:45 pm. Left Munich (30 min. off schedule). Ground visibility poor. Soon climbed above clouds to altitude of 29,000 ft. for crossing Alps. Some high peaks, like great icebergs, projected above the clouds. Still higher were streams of white cirrus. Sun bright. Bumpy over alps.

2:00 pm. Solid sheet of white below. We have ascended above the uppermost cloud layer.

2:15 pm. Just crossed border of Austria and Yugoslavia at 33000 ft. Captain tells us we will fly over Belgrade and thence along the Aegean Sea to Istanbul. Visibility there to be quite good with possibility, however, of rain showers. Temp. expected 48° . We continue with solid cloud blanket ~~below~~. Can see nothing below.

3:10 pm. Aegean Sea. Cloud cover breaking up. Plan now shifts direction to NE.

Time
change

5:50 pm. Landed at Istanbul. Air temp. 40° .

No rain ^{or snow}. Sun about to set. Saw little of countryside - green fields & sheep.

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Istanbul to Beirut

Jan. 10

Wandered about terminal building for 45 mins. Saw many beautiful wrought metal ear rings & bracelets, fancy Turkish slippers, Meerschaum pipes. Turkish sales-girls behind the counters with dark eyes & dark ^{straight hair}.

6:30 p.m.

Left for Beirut. We are an hour behind schedule. Red sunset and city lights, last fleeting impressions of a place I will probably not see again.

Time
change

Arrived Beirut 8:00 p.m. but found their time around 7:00 p.m. We must have crossed ^{at} back over time line. We began approach to field at 11,000 feet with landing gear down to steepen descent. Lights of Beirut beautiful - many of them on the flat and hillsides and randomly scattered - not in rows. Scattered clouds but no ground haze. Temp. 60°. Walked about terminal shops.

9:00 p.m. Left for Tehran. Will fly at 33,000'.

Time Change Arrived Tehran 11:35 p.m. by clock in terminal. Cold. Dr. Dart believes it to be high. Left for New Delhi about 40 minutes after stop. Declaration (printed) by Shah widely distributed throughout terminal. Chief appeal of declaration - stamp out Satan & illiteracy - 80% are illiterate. We will fly at 33,000'.

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New Delhi, India

Jan. 11

Arrived at New Delhi about 5:30 a.m. Went through ~~customs~~ ^{customs} with no problems and then rode to Ashoka Hotel with Mr. Hecht (sp.?), a U.S. citizen stationed here on government matters. A fast taxi cab ride. They drive here on the left side of the road as in Britain.

At Hotel, a grand structure many stories high and very plush, we changed some ^{U.S.} money for rupees. ~~One~~ ^{Twenty dollars} bought us 94 rupees, thus 1 rupee = 21¢. One naye paise = about $\frac{1}{4}$ cent. ^{16 annas = 1 rupee.}

Slept until 12:30 p.m., then had lunch to pleasant Indian music played by a band made up of 5 violinists, 1 pianist, 1 drummer, 2 sitar players, 1 celloist, and 1 bass viol. Two other players & their instruments were unidentified. A sitar looks like a giant ~~base~~ mandolin with a bulb at the finger board end.



Dart and I rode into town in small "taxi" - an open air, canvas ^{motor} top, scooter-like car. The trip cost a little ^{over} of 1 rupee. We wandered about the shops until about 7:30 p.m., after dark. We had been unable to make any appointments to see people about our mission until next week. Some impressions

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New Delhi

Jan. 11 People - great range in skin color - very dark to nearly white. ~~most~~^{few} people little taller than I. All seem to be dark eyed. Great range in degree of affluence. Perhaps 10% seen well-dressed and evidently wealthy; possibly 15-20% ~~are~~ obviously poor - 5% extremely so - bare legged, thin, clothes in rags. Small boys (especially) follow me about tenaciously trying to sell a shoe-shine or newspaper. Several little beggars cling to us for a time. It took a coin from each of us to loose one of them. Saw a boy only $3\frac{1}{2}$ '? tall, perhaps 8 years old smoking - a lively noisy little guy. A beggar ~~was~~ with both hands missing followed us for a time, gently prodding us with one arm stub, begging. Many poor people sit cross-legged on the ground with their wares spread out in front of them - trinkets, food, comic books, etc. One man was selling an ingenious device for making a pattern of white sand (?) on the ground. A cardboard cylinder with perforations was filled with the material and rolled over the ground. A beautiful design was left behind.

At a canvas top shop looked at a fire-making set - flint, steel, & punk. After many

New Delhi

Jan. 11 tries, I finally got a light. The secret seemed to be to hit a sharp edge of flint and to place the inflammable material on the upper side of the stone. The spark would then fly upward into it. The shop keeper could do it very quickly and Dart said in Nepal they use flint + steel sets to light cigarettes. Several of the shop keepers were Tibetans, one of them a lady known to Dart. Their wares of worked iron, beads (jade, etc.), + wood were spread out on the ground and one sat on a stool to look.

Saw turbaned individuals with heavy beards + long hair. Dart said they were shakas (pronounced - secks). It is their religion not to cut hair or beard.

Many women in long colorful gowns ^{wear} ~~wore~~ a red spot on the forehead. I must learn the significance of this. The people are polite and friendly. Dart says one would probably be quite safe from assault or robbery in town. despite all the poverty.

A young man, perhaps 18, talked to us at length while I was purchasing a piece of wood inlay work. He was a University student majoring in art. He identified the hawk-like bird seen here as a chale - a kit. It appears to be the same bird we saw along the east coast of Africa.

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New Delhi

Jan. 11

At dusk large numbers of a green parakeet-like bird about 10" long settled in the trees along the roadways in the center of town. Their clattering was added to the din of car horns, bicycle bells and human voices. Other birds seen were gray-back crows with a caw like our American crow and a myna-like bird. At the hotel I have seen English sparrows and several small unidentified species.

There is much tree growth in town, much of it evidently native. Although roads are paved there is much bare ground and a good deal of it is undulating and a little dusty. Since people spit and blow their noses (between their fingers) onto the ground, one desires not to inhale this dust.

I saw no dogs or cats but we did see a few ox drawn carts. The animals looked Brahman but I may not be correct in this. I saw one horse drawn cart with wheels 5' in diameter. There are many small European cars and bicycles. At a policeman stop near the parliament buildings some 15 cyclists were lined up along with 2 or 3 cars.

As noted earlier there is a great range in wealth. Within a few hundred feet of our 6 story hotel with its red carpet floors and

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New Delhi

Jan. 11 elegant shops are thatched huts of mud and stone and people in rags. Women sprawl in bikinis at the large swimming pool and fountain at the hotel while others in the dirt streets of the earthen village scrape out a hard existence.

Embassy buildings are situated SW of our hotel within an easy walk. Nearby also are government housing units reminiscent of those in our own Richmond area, but of motar. The excellence of the housing depends on one's cast, according to Dart.

Jan. 12 Went to roof of hotel and took movie shots of government housing cooperatives, the poor section north of the hotel, and the men who repair upholstery, etc. Dart and I then went to the Connaught Place where we cashed some travelers cheques and checked on our mail. While he went to the USIS (U.S. Intelligence Service), I went by "tricycle" taxi to the Ford Foundation Office at 32 Ferozeshah Rd. but found the office closed. I was told Fayette Parvin was head man. Returned to near Connaught Place and photographed street scene. (over) →

As I waited for a shot, a Mr. S. N. Das Gupta introduced himself. He was formerly with the Indian Assist Trade Commission

Das Gupta seemed perplexed and exasperated when I could not tell him precisely who I had come to see. He made it clear that Indians always have things well organized. He almost snarled with anger when I told him I was going to Pakistan. He said, "Why are you going? * Don't you know they are flirting with Communist China?"

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New Delhi

Jan. 12 for the Far East but is now unemployed. He said I should contact Mr. Humayun Kabir, Minister of Scientific Research and Cultural Affairs (TE - 33-535) to arrange for talks on science teaching. Dant suggests that we should avoid such casual approaches. Most will be wasteful of time but it is difficult to brush off a friendly person. Mr. Das Gupta wants me to meet him for dinner but I will have to decline.

About 5:00 p.m. I wandered about the countryside beyond the hotel grounds looking for birds and other wildlife. Tried "squeaking" and attracted about a dozen birds of several species along an overgrown fence. Near a watercourse, found a colony of Indian monkeys feeding on refuse on an embankment near a housing unit. A young Indian, B.

Dhanushkodi, who works at the hotel ^(over) joined me and we walked into a wooded patch where we found several species of birds. When a dog barked, the monkeys took to the trees. My guide told me that the children feed the monkeys and that the animals have become quite tame. They came to within 5 ft. of me when I crouched and moved my fingers as though I had something in my hand. One large individual was pointed out as the chief. Dhanushkodi said the animals are protected

Dhanushkodi has completed 10th grade but has had no college education. He spoke English well and I could understand him better than most Indians I've contacted. He is very dark-skinned, almost black. He wore a green sweater and slacks and looked western in dress as do many of the people here.

I found he agreed with me that a serious problem is the great number of people and that birth control was essential. He was quick to point out that India is working on this problem and that the "pill" is now in use.

He was proud of Nehru and said he was a kind man, considerate of the poor. The poor are giving "blood money" to fight the Chinese war and are more responsive to the national emergency than the rich, he claimed.

He noted the contrast between the Ashoka Hotel and the hovels nearby, and said such conditions prevail in India.

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2,2

New Delhi

Jan. 12 because they helped man build a bridge, ^{to Ceylon} by dropping stones in the sea many hundreds of years ago. Law also protects birds. I tried "squeaking" again and called in a green parakeet (?), a Karuppan Thalyan (meaning black head), ^{and}



and a wren-like bird with long erect tail, slender curved beak & nervous manner. Glancing to SW I could see about 10 chale circling over the Ashoka Hotel. They evidently use the rising air currents, deflected by the cliff-like sides of the building. There are obviously many birds that could be studied by school children. The small natural woods with its monkeys and birds is a fine outdoor laboratory. Chewed leaves indicate that insects are present although none was seen, perhaps because of the time of year.

We walked into the village of the poor I had photographed from the top of the Ashoka. Two little boys admired ^{my} ~~my~~ lizard tie pin and I crouched to give them a close look. Mr. Dhannakoti explained to them what it was. Soon some 8 thin, bedraggled men stood along the path, having emerged from their humble dwellings. I learned they thought I was a government official and feared I was going to order clearance of the area for construction of a building.

I have also been told this bird is the nightingale
or bull-bull.

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New Delhi

Jan. 12

At 5:15 p.m. the road SE of the hotel was a great stream of traffic - tricycle taxis, auto taxis, carts, small European cars, and bicycles bearing the town workers to their homes.

During lunch, Dr. Dart told me a little about Buddhism. Buddha was a teacher who grew up in Nepal. He never claimed deity although his followers, many of them, regarded him as a ~~great~~ God. His teachings grew out of Hinduism and eventually formed a rather distinct religion. The goal in both Hinduism and Buddhism seems to be to have one's spirit be freed from the wheel of birth - living - and dying and to have one's spirit join the great spiritual essence that permeates the universe. Growing out of a hard existence, the philosophy is one of developing a capacity to endure and to accept one's fate in tolerance and tranquility of spirit. All life is ~~respected~~ respected but over not necessarily treated well. An animal may be mistreated but not killed. Extremists, now seldom seen, may sweep the ground in their path to avoid stepping on ants or may cover nose and mouth, not as a protection against germs, but to prevent them being inhaled & destroyed, according to Mr. Dharmachodi. This religious viewpoint is an impediment to scientific progress.

The Buddhists evidently do not necessarily believe in a God in the form of a man. The life force may be worshiped in many manifestations and thus God-like properties may be attributed to a variety of living things.

Bird Sanctuary at Bharatpur, 110 mi.
from Delhi.

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Asian Trip

New Delhi

Jan. 12 Nature is not viewed as something to be controlled but rather to be endured. The Christian philosophy of good works (at least a view held by some Christians) does not apply and there is little effort to convert, to better the lot of one's self and others. There is little force among the uneducated to push for cure of disease, improvement of living conditions, because of their ancient attitude of acceptance of what is. Those who are striving to achieve the easy life of the West are impressed by our technology and are inclined to get there quickly and are not much interested in basic research. If they do not accept the importance of fundamental studies applied in their own country and their own cultural context, they may forever be dependent on outside science. At least this is the situation as viewed by Dart who has spent a year or so in Nepal and nearby areas. It will be our job & that of those to follow to encourage the acceptance of the importance of pure science as well as the practical aspects of science.

Jan. 13 Sunrise at 7:20 a.m. through a ground mist and a low-hanging brown haze (smog?). I'm impressed with the great numbers of birds. The morning chorus was so great I was drawn to the window where I could

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New Delhi

Jan. 13 See gray crows, flocks of the myna-like bird, many smaller species, chakras, etc. The chorus reminded me of the crescendos of bird music heard in my boyhood in the Santa Monica Mountains. A few minutes after sunrise the songs ceased abruptly and only an occasional crow was heard. Mornings are cool but not uncomfortable. One feels comfortable dressed in undershirt and coat at night outdoors. The weather so far has been beautifully clear, except for morning haze and some dust in the afternoon.

Jan. 13 Met Mr. Dhanushkodi at 9:40 a.m. at the monkey site. Filmed the monkeys and Indian children feeding them. The children were afraid of the old male who occasionally snarled & charged them and were impressed when I went into the woods to film them when they were frightened into the trees by a dog. The band contains ^{at least} 12-15 individuals. There seems to be only one dominant male. There were 3 or 4 babies old enough to be on their own, intermediate sizes and I saw one large female with an infant clinging to her belly. One adult seen to drink spout a minute or so sweeping his ~~head~~ hand across the water surface before drinking, perhaps to remove surface contaminants since the stream, although clear in places had a floating

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scene. The children attracted the monkeys by making a cooing or hooting sound and in this way called them over for photographing. The animals took food directly from the hand. When frightened into the trees some climbed to a height of 50 ft. Mr. Dhanushkodi said the wild patch was protected for the sake of the monkeys. Tameness of the wild birds is further indication of the regard these Indians have for animal life. Repeatedly small song birds fed within 8 or 10 ft. of me at a flock of some 50 sparrows has been seen for several days now alternately moving from a tree to the ground in the living area of one of the thatch roof shades N of the hotel. The birds fly up into the tree only when they are nearly stepped on. Chales sit on lamp posts 15 ft. overhead and the gray-back crow works garbage within 12 ft. of playing children. A hoopoe foraging on the ground 15 ft of me as I filmed it with telephoto. Tameness also applies somewhat to small mammals. I saw a weasel-like creature in a gully at a distance of 8 ft. and a dorso-ventrally flattened shepish-like animal at 15 ft. The ease with which people can get close to animals should make possible effective use of field observations in school science studies.

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Photographed until 12:00 noon, getting shots of the Indian children, chole, cows & dog at refuse dump, a man being shaved with old style jack knife - type razor - barber and his customer squatting on the ground, "shops" keepers sitting on the ground with their produce spread out in front of them thatched huts, etc.

The children (& adults) are eager to be photographed. I had difficulty singling out subject matter because I often had a backdrop of grinning faces. The children would scuffle and occasionally hit one another to gain a position in ^{the} front row. The barber combed his hair when he learned I was going to photograph him.

At one time I had some 30 children all under 10 years old pressing against me with such force I could not move until the adults came to my rescue. Many of these children are poorly clad and it appeared that about 2 out of 5 had a running nose. All were thin. Indeed, I have yet to see a fat person among the poor.

The Indians are obviously fond of their children and among the poor ^{the children} ~~the children~~ constitute one of their few ~~valuable~~ possessions.

In the afternoon Dr. Dart went off for an engagement and I continued my photographic work, getting a picture of the hotel and traffic along the main road to town. Found bats 8" long (40+) on side of Ashoka Hotel behind large pipe. Animals arranged in tandem.

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At 5:30 p.m. Dr. Dart and I went to a reception of Film Festival people at the home of John Reid. Reid is head of Calcutta USIS.

After the reception we went to the home of Dr. Fisher (USIS) ^{In charge of films (USIS) for all of India.} for dinner. This social affair was productive with respect to our project. We met

The following people:

(USAID)

Dr. and Mrs. N.E. Bingham of 77

Sudnager^{sp?}, phone 75442. Dr. Bingham has been here for many months. ^{He & his wife are advisors on sci. education.} He recommended strongly that we try to visit the following schools:

Ramjas High School, No. 4, NW of Connaught Place. ^{L. N. Agarwal} Lady Irwin High School, Curzon near USIS office. Principal is Mr. Sen Gupta. Modern School at the edge of old Delhi. USIS headquarters is at 1 Sikandra Rd.

phone 17173.

Dr. D. S. Nigam, Coordinator for Directorate of Secondary School Programs in Education. He explained that they were engaged in a program to up-grade teacher training by workshops, etc. but that a big problem was transportation of teachers to the training centers. Few have personal cars. The teachers are not obliged to attend and do not get paid. Training is in all educational areas. The program is 6 years old.

working for
America Union
SAJ which
is contact
here

McCracken

Mr. Reid's address is 32 Nazamuddin East.

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Mr. Bingham suggested several contacts -
 Dr. Kothari, professor of physics at Delhi Univ., chairman of the grants committee ^{Phone 228996}
 and Dr. P. Maheshwari, chairman of botany at New Delhi, Univ. Bingham is involved with DEPSE of which there are 69 centers in India. The organization provides U.S. technical assistance. At each center a jeep, film library, and library is supplied and the principal of the school acting as a center is the local director.

The program and focal directors are under the Directorate of Education, Mr. Raj Roy Singh, in New Delhi.

Bingham mentioned that a person who knows what's going on in education is S. Doraswami, a botanist. He edits the major botanical journal. His wife is Deputy Director of DEPSE and really is in charge of the whole thing.

Bingham has promised to give me the name of a zoologist high up in Indian education in the Delhi area.

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Mr. B. K. Athalge, director of The National Institute of Audio-visual Education. Indraprasth Estate, Ring Rd., New Delhi (near WHO headquarters). He is involved in the development of instructional aids, including films, but film production is secondary to other aids. His office prefers to use foreign films at present time and to dub in Hindi language. He pointed out there are 14 languages in India but that they use only Hindi and English in films. He said it may sound unpatriotic but that he feel there should someday be a world language and that it probably should be English.

Mr. and Mrs. V. Ranganathan. Mrs. Ranganathan ^{Central Institute of Education in English} Teacher English. Mr. Ranganathan is Deputy Chief of Scientific and Defence Development Organization in the Ministry of Defense.

Mr. and Mrs. Weatheraby. Mr. Weatheraby is head of USIS. He was formerly stationed for 6 years in Egypt and has been here 1 yr.

Miss M. H. Mason, USIS, will head Film Festival in Calcutta. She lives at 7 Chowringhee Rd., Calcutta 13. She mentioned ~~at~~ a Mr. Eric Avari at Darjeeling who is interested in nature study and runs a Museum of Natural History.

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The place is about 300 miles ~~of~~ north of Calcutta at about 7000 ft. in the foothills of the Himalayas. Very cold there now - snow. Can reach area by rail or bus from base of mt. First leg of journey to mt. base can be by plane or train.

Dr. Dart said that along the south base of the Himalayas is a strip of jungle, preserved because area is plagued with malaria and alluvium is so porous out flowing streams disappear in ground and ~~reemerge~~ emerge to south. Area is unsuited to rice planting. In this jungle strip are tigers, a wild ox, elephant, etc.

When I asked Weatherly for name of key ^{in education,} man, he mentioned Dr. Kirpal, secretary in Ministry of Education.

At 2:00 p.m. tomorrow the Film Festival will start and Mr. Sethi of Central Institute of Education will be there. Phone 43041 4515. (Mr. Allen).

Met also commander Bird (M.O.) who is administering the Film Festival program. and Walter Auffenberg, an old friend, from BS C S.

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Dr. Dart & I sorted out people we will contact individually & jointly, concerning our service project. I went first to see Dr. Dorothy Nywander an old friend of Bill Griffiths. She is Professor Emerita, U.C. Berkeley, & formerly in Public Health and the one who brought Bill to Berkeley. She obviously was well acquainted with India and was very helpful. She is presently serving as a special health consultant in family planning to the Ministry of Health. She stressed that I should contact Paul Leonard, formerly president of the Univ. of San Francisco and who is now directs educational work for AID. Phone 22-67-74, home 750 27. He is at the Central Institute of Education, Lin. 22. 33 Probyon Rd., Delhi 6 - near University. She also urged that I see T.K.N. Menon who is concerned with secondary training institutions in India. His phone, 27019. She felt it best if I were to meet him through Leonard. Athalye was identified as having good ideas on paper but thus far he has not been very effective. This opinion stems from the view of Dr. Udell of the Univ. of Penna., who spent 1 yr. as an audio-visual consultant in Athalye's division. Dr. Nywander mentioned that a Margaret Patterson of the Ford Foundation

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had spent much time (a year?) conferring with science teachers. Reports on her findings are in the Ford Foundation Office but evidently the bulk of her finds were taken with her when she left.

I touched on the subject of birth control and Dr. Nyswander mentioned that she is trying hard to get family planning advice and help at the family level instead of at the level of a social service program, involving finger printing and other routine. Indians should be able to get contraceptives at drug stores as we do. The pill is not in use, she said. The Ministry of Health does not want Indian women to be used in experimentation. An intrauterine coil is being used. The rhythm method, although still recommended has proved to be ineffectual.

I met Dr. Fayette W. Parson, formerly from the Univ. of Florida, I believe. He is assistant representative of the Ford Foundation here. He had heard we were coming and had looked through the lab. science document.

In commenting on Indian education, he said the Indians are much concerned with quantity of education and that the level of quality is declining. I believe he intimated this to be caused by the increase in population. Ford offered a plan to select a few of the better schools and to upgrade with ~~for~~ Ford help the quality of education. These schools were

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Jan. 15 to be looked upon as models and were to serve as a vanguard that perhaps could stimulate a more widespread upgrading of education. I believe Ford had in mind developing perhaps 8 or 10 such schools but although the Indian contact on this matter seemed to agree, some time later he talked about using the money offered to help the schools in a depressed area, evidently missing (or ignoring) the Ford objective. Parvin now is simply biding his time, hopeful that the Indians will eventually accept the original proposal.

Ford also urged, and was willing to help support, ⁵ ~~one~~ primary teacher training institutions ~~in each~~ as a pilot effort but the Indians, for political ~~reasons~~ reasons want to have one in each state. They are thinking in terms of 85 units.

The big bugaboo to improving science training is the External Examination.

The attitude is negative if not outright rebellious against teaching anything not likely to appear on this Examination.

The examination is set by retired faculty members and others (university scholars) who form an elite group that determines what must be known to enter college.

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At Calcutta, for example, this group sets the exam. for it and 72 affiliated colleges. A similar pattern occurs elsewhere.

Univ. Grants Commission has been working on the External Exam. reform. Parvin feels that until this rigid pattern is broken there can be little change. He feels it will take an act from some high level office to bring it about.

In the afternoon, visited the Film Festival which was held at the Central Institute of Education 33, Chhatra Marg, Delhi 6, at the University. This was one of the sessions in the series that is being conducted in India by the American Scientific Film Forum "New Approaches to Science Teaching". The Delhi sessions are on Jan. 14, 15, 16, and 17. at 3:00 p.m. Welcoming remarks were made by Prof. T.K.N. Menon, Principal, Central Institute of Education. An inaugural address was made by Prof. T.R. Seshadri, Head of the Dept. of Chemistry at Univ. of Delhi, and Dr. Walter Auffenberg, Asst. Director, Bio Sci. Curriculum Studies, Univ. of Colo., commented on the films. Dr. Richard A. Boolootian was there. He is vice-president of the American Science Film Association.

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Jan. 15. Univ. of Calif., Los Angeles. Dr. Edward W. Bird, Commander, U.S. Navy, Bureau of Medicine & Surgery is directing the film program and Mrs. N.E. Bingham, Educational Television Teacher, North Central Florida Public Schools was present as an educational advisor.

Saw most of film "Baboon Behavior" & all of "Darwin's Finches". The latter is supposed to be for elementary school children but I'm afraid it would not get across the idea of "natural selection" which was mentioned several times in the film. The Indian audience was quiet and unresponsive. Auffenberg said their faces were immobile and he could not tell whether his remarks were pitched at the proper level.

Upon arrival at the Central Institute, a number of ~~to~~ us visited with Dr. Menon who is Head of the School of Education at the University of Delhi.

Auffenberg & Boolootian were present.

Dr. Menon told us that all children are required to take general science, I believe at the level of what they call the "middle" school. In Delhi in the last 3 years of secondary school, science is optional.

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Dr. Menon pointed out that often students who fail in other professional programs requiring an MA or Ph.D., turn to teaching. This was a familiar ring. He feels that integrating subject matter and teacher training will help and India is moving in that direction. The teacher training program would then more closely resemble that in the U.S. At the present time the student gets 4(?) years of subject matter work and then his training in education.

In 4 parts of India science teacher training centers are being developed. These centers are located in the science education departments. It is a 4 year program. The objective is to select high school graduates and give them an integrated program of science and education. The 4 training centers will not only prepare science educators but will also provide in service training for teachers.

He mentioned that Dr. & Mrs. Bingham (Univ. of Columbia sponsorship) send out to U.S. and bring in trained Indians in a program to develop science educators. They have also been involved in conducting educational surveys in India.

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Dr. Menon is strong for science and feels that "our survival depends on it." He was interested in the laboratory guidelines material and wished a copy of the Nat'l. Acad. document. I promised him he would receive the revised version that would appear following our trip. He gave, at least, lip service to the need for the experimental approach to science in contrast to rote memorization but I do not know how deep this goes. He is obviously a key man and highly intelligent and capable. There was not time to fully develop the ideas expressed by the manual. I had caught him between showings of films and he is leaving for the south tomorrow. I did speak to him briefly about my personal work in the elementary grades and emphasized our desire in America to have children experience the scientific method and to get some insight into the way a scientist proceeds. Menon felt this highly desirable.

Prof. Seshadri, the chemist, at one point made the remark that we must not be "too modern" (with respect to science) too early. He expressed this view when I told him we were concerned

about the great lag between today's science as known to the scientific world and that found in the schools. He remarked that children must have their fairy tales, to which I agreed. In his inaugural address to the film festival gathering, he stressed the beauty revealed by science.

There are some 100 teachers colleges in India. The hope is that eventually every college will have inservice program for upgrading teacher training in all phases. At present time the Central Institute provides a jeep, audio-visual materials, a library in connection with this program. Menon is head of this inservice program. Secondary school teachers are to be brought in to these centers, at the present time their participation is optional and they are not paid. The program is 5 yrs. old.

Menon also mentioned that they were encouraging the formation of Science Clubs, and that they were attempting to search out superior students in science. It is a tremendous job. There are 20,000 secondary schools. There must be screening at the state and finally the national level.

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The present objective is to identify 500 outstanding students.

Starting this summer there will be summer institutes of science. These will be of 2 months duration. They will be held in Delhi, Madras, Bombay, and Calcutta. At each 4 fields of science will be covered - biology, chemistry, physics, and general science. The institutes will be held at Universities. The Minister of Education, Dr. K. L. Shrinani is organizing the program.

In travelling across town to the University, which is about the same distance N of town as Ashoka is to S, we went through a wild section as we approached the Univ. I hope to stop there before I leave.

I was told by Dr. Cleland, who will head Science Film Festival in Madras, that the large walnut-like tree, prevalent in the area occupied by the monkeys mentioned earlier & seen along roadways is the Neem Tree. One can break off and pray the tip of ~~the~~ a branch and use it like a tooth brush. It can be used to massage the gums. There is a tooth paste known as Neem paste.

I told Boolootian about my population film. He has offered outtake on his

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elephant seal work if I wish any.

I failed to mention earlier that in the evening, in town one sees circles of people standing and eating fried cakes, etc around an outdoor cooking. This is merely a hot plate over coals and is tended by a man who may serve up the hot food on large leaves.

In connection with the birth control problem, Mrs. Weathersby feels that birth rate will fall when the people have electric lights and T.V. At present there is nothing to do after dark but to go to bed.

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At 8:30 a.m. Dr. Dart and I visited Dr. Paul Leonard, Director for educational projects of AID (AID formerly TCM - Technical cooperative mission), at ~~Farsi~~ Faridkot House, Lytton Rd. He had the following comments on Indian education: There are 75 million children under 14 yrs old in India at present. In rural areas only 40% get through the 1st grade, 30% enter ninth grade and 1% graduate from the University. Half the ~~the~~ secondary school children fail. In Delhi 75% go through the elementary school - through 8th grade. High school consists of 9th through eleventh grades. Only 50-60% of the children over all of India pass their Matriculation or External Examination which then permits them to go on to college. Even though a student is failing in his work, he may continue and when he

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Jan. 15 completes secondary school his diploma is marked "Metriculation Failed."

Each state sets its own Metriculation Exam. However, little by little, increasing emphasis is occurring on the Internal Exam. which in Delhi is now weighted about 20%. The University faculty sets the Metriculation questions.

Faculty members decide ~~their~~ courses, provide book lists, and other requirements and then formulate exam. in terms of these requirements.

Leonard at first deplored External Exam. but now feels it has merit. If there is no External Exam., there is no standard for measuring performance and little protection of the teacher from parental or political pressures.

Leonard is getting under way this summer with an institute program. Among topics to be considered will be the PSSC material. The high school physics course requires only \$125 worth of equipment. The plan is to buy a few sets of equipment and Indian artisans will copy them. There will be 4 institutes (as I have described earlier) under the University Grants Commission.

Leonard said the Russians are trying hard to get into India with science programs. UNESCO has been trying to

Streets have curbs of stone blocks, 6" x 10" x 16" that are fitted tightly together & may or may not be cemented. When not cemented it makes possible widening the street without having to destroy the curbing. I saw many instances of Indian laborers, including women engaged in widening streets by resetting these curbing stones.

Have seen piles of coal. Fuel evidently consists of coal but ~~to~~ it is apparently unipated. An oil engineer travelling with me on flight to Calcutta said no natural gas in India. Kerosene & charcoal used. Natural gas in W. Pakistan.

It is said (Miss Mason, USIS, Calcutta) that some poor people cripple a baby's hand so that they can be more successful at begging. They hold fast the child's deformed hand.

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Jan. 15 encourage setting up of laboratory science programs in 6 or 8 colleges and universities. Several countries were considered with respect to this contract, the U.S., United Kingdom, and there was a place for a write in when the group voted on the matter. Russia was given the contract on a write in, yet the U.S. is mostly footing the UNESCO bill. Leonard is perturbed with the ~~operation~~ operation of the organization. He does not want the Russians to come in and fool around in the secondary schools. Actually the contract has not yet been agreed to by the Indians. He hopes the Indians will decline.

Leonard has checked with the Indian Ministry of Education to see if the U.S. PSSC course might be used but so far the Ministry has been unresponsive. Prof. D.S. Kothari of the Univ. Grants Committee evidently approves, however. Financing of institutes would be distributed as follows: Ministry of Education 25%, University Grants Committee 25%, and USIS (AID) 50%.

Forty teachers will be included in each institute. There will be available subject materials in each teacher's field of interest. The institute hopes to help these teachers adapt the new curricular materials and there will be a follow up on these ~~to~~ teachers.

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45 in their respective schools. The effort will be to get the best teachers that can be found. There will be one U.S. professor for each workshop.

A few incidental comments: There are 5 elementary school texts in Punjab area. Out of 250 teacher training institutes, there are only 5 science labs. Out of 18000 secondary schools in India, 2000 teach physics.

Leonard expressed a desire for copies of our guide-line manual for use and evaluation (of the manual) in the summer institute program.

Dr. Dart enquired further about drop outs from school. Important reason is economic. Children are obliged to work. "The old man quits at 45, makes peace with his friends and relatives prior to that, then spends his last 10 years making peace with God."

90% of secondary schools are private. "All" students are after government jobs. This stems from British background. They set up secondary schools to pick people for government jobs.

Leonard has serious question as to how many children should go through secondary schools. The thinking through on this point will be done by the Ministry of Education and the University Grants Committee. The Ministry will then advise the states on this matter.

The central govt. gives grants to the state govt.

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Jan. 15 Poor children get their tuition waived and the government pays the bill.

The Summer Institutes for Science ^{Teachers} will be in June and July - or it may start as early as May. It will run 8 or 10 weeks.

Leonard seemed unsure as to what could be done in biology at pending institute. BSCS materials, he felt, needed to be adapted to the country, drawing upon examples of Indian flora and fauna and such an adaptation has not been undertaken. I suggested that field observation approach might be stressed and described what we have been attempting with the ranger program in the Jewel Lake Nature Area. He agreed something of this sort ^{could} ~~might~~ be done. I pointed out the excellent opportunities to study birds, since they are so abundant and tame in India.

At 10:15 a.m. I visited Professor P. Maheshwari, chairman of the department of botany, New Delhi Univ. I described the purpose of my visit, briefly outlined for him the content of the guide-lines report and allowed him to look through the manual. He seemed pleased with it and asked if I could send him a copy which he would evaluate and return. He

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feel that as long as copies were sent to specific persons with whom Dr. Dutt and I had spoken, we need not fear that there would be premature printing.

In answer to my query as to whether scientists, educators, and secondary school teachers had begun any cooperative effort in India to upgrade science teaching, he pointed out that he is chairman of a committee made up of 15 biologists drawn from all over India to outline projects for writing science books.

The committee will meet for two days and will draw up book outlines which will then be turned over to writers who will be in constant touch with the scientists.

9th grade class level starts biology. The children then are about 15 yrs. old.

Those who take science have a choice of life science or physical science. The better students choose the latter for ~~there~~ at present it carries far more prestige.

Maheshwari lists the science subject fields in order of prestige from highest to lowest as follows: mathematics, physics, chemistry, botany, zoology, anthropology. The best students never come to biology! He feels biology should be required of all students, and urged me to do all I could to bring it about.

He knows G. ~~L.~~ L. Stebbins and has

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Jan. 15 visited in the U.S.

Maheshwari summarized his remarks by saying he thought (1) Biology must be integrated with physics and chemistry (2) must be taught as a unified science, including both botany and zoology and (3) should make use of field studies.

I described my own work in the elementary grades and he asked me to send him a copy of "animal coloration".

I then went with Dr. Nagai to the Birla High Secondary School, ²²⁻⁸⁹⁻³⁹ grades 6-11. I believe he said the school ~~conferred~~ conferred the Master of Science in Biol. I met the principal Dr. M. D. Sharma, a most gracious gentleman and visited the biology, chemistry, and physics laboratories.

The biology lab was a room perhaps 30 x 40 feet (quite spacious). It probably would hold some 24 students. There was adequate desk space but rather weak lighting from a bank of N windows (it was overcast) & no lights were on in the lab. About 10 students were at work, several learning the parts of a flower, which they were pulling apart and describing in connection with learning the family characteristics. The rest

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were dissecting recently pithed frogs. I learned the frogs had been brought in for my benefit when they learned I was a zoologist. The study approach was morphological and evidently rote memory. I asked to see examples of previous work and was shown 3 newspaper covered, hard back notebooks with drawings and descriptive data on plant and animal types - emphasis on morphology and classification. Each accepted drawing had been signed and dated by the teacher, a shy, youthful slender young man.

I was then shown the students' "rough" notebooks which contained mathematics (trig), physics, & other notes, evidently taken during lectures. Finally I saw neatly written answers to specific questions, all drawn up by each student in notebook form, evidently in preparation for the External Examination. An example —
"What are the evidences of organic evolution?"
① Evidence from paleontology
Then an explanation followed by items ②, ③, etc. I asked if the students actually saw fossils or could go into the field anywhere to find them. The answer was "no".

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Jan. 15 Wall exhibit cases contained rather decrepit stuffed animals with dioramic backgrounds - mongoose and cobra, hawk feeding on a bird, other stuffed birds. A wall case contained many small jars of preserved animals in spirits. I was told there were species from India, illustrative of taxonomic types. Obviously the approach here is the old morphology - taxonomy one and there appears to be little of modern biology.

The chemistry lab was smaller, perhaps $25 \times 25'$, also poorly lighted (no lights were on). The students used small spirit lamps for heating substances. Numerous dust-covered bottles with old-looking labels stood on the center piece that ran the length of the work tables. The tables faced one another and were separated by this central partition except where sinks were located. In none of the labs visited were any black boards seen except for one small one in the physics lab. The chemistry students - boys of perhaps 14-15 yrs. were engaged in qualitative analysis and each had been given an unknown substance to identify. In the physics lab. the students were studying electrical conductivity of

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of wires - some sort of potentiometer approach.

I then had tea and cakes with the principal & Dr. Mehta, wrote a comment in the guest book - mine the first entry in a new book, then we went out to the school yard and watched the entire student body of 1300 boys do a series of setting up exercises in precise drill tempo. A teacher called orders from a microphone on a platform overlooking the field. The boys were well disciplined and kept a perfect rhythm of activity. When I came to the platform they clapped and the principal said it was a greeting. At the end of the drill the field was quickly cleared as the boys marched off in twos, arms swinging stiffly through a large arc.

I learned that this was the biggest institution of its type in Delhi - that the labs hold 24 students and that a given lab. handles 450 students a week. A lab is open from 7:30 am. to 1 pm. The school is on split shift to handle its large enrollment. A lab. lasts 35 mins.

The building was mortar covered, paint weathering & steps of stone worn. It looks like it has had long use.

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We then went to the Municipal Corporation HSS which contains 450 students and saw a much better group physics lab in operation. They were working on the same problem as the previous group. Their intelligent-looking teacher, Ved Ratna, spoke excellent English. The school is located on Rose Ave. - Phone 44085.

B. K. Thaper is the principal. He said they gave no biology because they could not find a satisfactory teacher.

He urged me to go to a town called Shardaagram enroute to Karachi where ~~Keshod~~ ^{is airport} I could see lions and other big game in the wild. A former student of his is principal of the Residential School there and could drive me the 12 miles out of town to the animal protection area. Ghandi started the school. The principal is R. G. Chaturani. The animal locality is Somates. Thaper was a former student of Nigam. He has been to the Univ. of Wisconsin as a Fulbright fellow. Nigam, incidentally, has been to Canada.

Nigam feels there must be more than manuals to upgrade Indian science

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teaching. He points out there is no dearth of written words. He suggests that we send scientists who can meet with Indian secondary school teachers and go over PSC or other curriculum materials with them. These teachers then can, in turn teach others in workshops. Their training may snowball.

~~He~~ Nigam mentioned that there were "bird gazing" clubs in Delhi and that people are very fond of the birds. One poor man, when asked why he let the birds eat his grain, said "Man must feed the birds".

At 3:30 p.m. I had an appointment with Jt. Educational Advisor, Raja Roy Singh at the Central Secretariat, N Block, at the Ministry of Education. I arrived early so wandered about the grounds. On each side of a long central quad with roadway are groups of buildings of red sandstone (?) that are mirror images. ~~Room~~ Nera has offices in the S Block. To the west is the president's quarters, ~~and~~ There are many pools set in the walkways. They have no elevated drains. One could easily

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Jan. 15 blunder into them. The water was dark green, heavily grown to algae. The myna-like bird and the gray crow were prevalent. I saw a taxi wizz past with 3 feet of a foraging "myna" and it did not fly. This bird is robin size, has yellow legs and bill, a yellow bare patch around the eye, olive back & chest, dark tail and wings. There are white spots at the top of the tail and a white patch on the secondaries.

Over the entryway to one of the buildings of the N block was the following inscription: "Liberty will not descend to a people. A people must raise themselves to liberty. It is a blessing that must be earned to be enjoyed." Inside was public information on the Chinese aggression.

Dr. Singh, a vigorous, solidly built dark skin man of 45± received me graciously and listened attentively to my description of "guidelines". He expressed sympathy with the views expressed and said he would set up a group to study and evaluate the proposals if we requested this and set him copies.

I described my work in elementary school science to illustrate further the kind of approach presented in "guidelines". He seems to be truly interested. I described my anxiety in meeting elementary school children and he told how some of them

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Top scientists were made very nervous when they got up before secondary school teachers to describe their work and to help in upgrading teaching.

I promised him I would send a copy of "animal coloration". It should go to the Joint Educational Advisor, Ministry of Education.

Singh mentioned a man to see was A.C. Joshi (vice-chancellor) - Secondary Education.

He is a botanist who is chairman of a committee which is in charge of textbooks in general science. He is president of the Science Teachers Association in India. He lives in Chandigarh, 140 miles away so I'm afraid we'll miss him.

Sent off 16 mm film rolls 5644 & 5666 to Larry Dawson for processing.

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Today I had an appointment with Dr. G.K.

Athalye, 132 Kaka Nagar - 11 Phone 7-43-16.

He is in charge of the National Institute of Audio-visual Education, Indraprasth Estate I, Ring Rd., Delhi. The Institute is located near the World Health Headquarters. My taxi driver turned out not to know the way and I was 15 minutes late. Athalye had gone. Instead I talked to R. B. Lal, Technical Officer. He turned out to be a gold mine of information. Lal is a slender young man in his early 20s, perhaps. He spoke frankly and at length on the subject of Indian education.

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There follow some of his points: The NIAE is a central government organization that trains people for subsidiary state units. The latter are supervised and financed by the state governments. NIAE started in 1956, but has only really been active over the last 2 years. Most educational films distributed are imported, however film strips are easily adapted. The Institute contains the largest audio-visual library in India. It has accumulated 7-8000 films. Most home made films are of mass media type.

Most schools want films in regional languages, at least at the elementary grade level. The higher income groups, however, want films in English. The primary schools tend to be run by governmental agencies.

Lal pointed out there was no use in putting out films in great quantities until more schools have adequate projection equipment & facilities. Hence Institute concentrates on charts and booklets which it mass produces. They also stress training of teachers to use ~~new~~ audio-visual media. Teachers are brought to the Institute for a short term course of 3 months. They are given an allowance in addition

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to their normal salary. Hostel living accommodations are provided. Since the period of training comes in summer, there is no disruption of school routine. The Institute gets more applicants than it can handle.

Lal then enumerated on general aspects of Indian education and common elements that have emerged in other interviews appeared. He said science teachers are often the inferior students except for those trained in a few exceptional schools. Thus often the science teacher is not a person who can understand the need for improvement in science training.

The External Examination tends to be repetitions - the same questions appear year after year. This applies also to the questions covering laboratory work.

Each state has an examining board. There are 14 states. People are asked to serve from highschools and colleges. A closely knit group forms and the pattern perpetuates itself - the whole thing becomes a closed corporation.

The exams. seldom try to test real understanding of science. In the mathematics area, however, things are

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Jan. 16 a little better. Stress tends to be on rote memory. Little testing of ability to think and to reason logically. Institute has been forced into selecting films that help on the exams. However, outside films are often general.

Lal. said there are 3 basic problems that face those who would upgrade education:
(1) There is a gap between what is being taught and what is being practiced by the student after he leaves school. Until recently there was nothing for a student to do in science later on — most of those trained in science ended up doing administrative work, civil engineering, etc. On the technical side, for example, an engineer might become merely a person who handled foreign equipment — sending it back to the country of origin for repairs, reinstalling it on its return. He really was nothing but an administrator.

(2) There is the great impediment of the External Examination. To improve laboratory science this must be changed. (3) Extension service training, like that supervised by Dr. Menon will be important. It is the job of the extension service to see that the training of the student will be such as to equip him for what he will do

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later on. This will involve teacher workshops to help them improve and reorient the laboratory. The Council of Educational Research and Training is involved here. There is also training provided for administrators and planners. (stimulated by UNESCO).

Lal said the Indian government is not hesitant to give money for pure research. That if the atomic energy program is so oriented, I wonder, however, how they would feel about "nature study".

Lal said to get appreciation of value of basic research, he feels one must start in India at the college level.

Most of their chart materials and other teaching aids try to ~~extend~~ extend learning beyond the level of rote memorization but the Institute is just beginning this kind of effort.

Indian school children either get no science in school or a portion of them train to go into science. There is no general exposure to science.

Lal. feels that science training probably should become compulsory like 3 Rs. Even those who do not go into science would be helped.

The poverty of the people limits greatly what can be done. Most children must work after school. They do not even have time for sports. ~~At~~ Some 50% are so affected. There is little money for hobbies nor is there time for science

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Jan. 16 when life is hard. A tired person will have little incentive to explore his environment in the scientific sense. He may have little energy left to carry enthusiasm.

Hal feels the thing to do is to test out ~~At~~ our Nat'l. Sci. Found. "guidelines" proposal in a limited area first.

He then showed me about the Institute. They have closed circuit T.V., projection equipment, sound recording equipment. I saw posters and charts in profusion. He showed me a wooden box with sloping glass plate & lights so arranged that two pictures could be flashed, one after the other. The demonstration box had pictures on family planning. One ~~scene~~ ^{scene} was of a well furnished house, the parents with leisure - the father reading, the mother sewing and two children playing. The second was of a run down room, the father dozing ~~before~~, tired from overwork, the mother was ironing and 5 or 6 ragged children were fighting.

I asked about the Chinese aggression. It is referred to here as "cartographic aggression". About 50 years ago the Chinese moved into the Tibetan plateau country N of the Himalayas. This area had long been illly defined as to whether it belonged

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to China or India. Lal said the affinity of the people was more toward India than China. The infiltration was accepted by India. Now, however, China is claiming areas at E & W ends of Himalayas and their soldiers have come over the Himalaya crest and have moved into valleys that open out onto the Indian plains. India feels if she allows such "nibbling" to continue, no telling where it will stop.

This evening Dr. Dart filled me in on a little Indian history. He told about Fatehpur Sikri, a sandstone city just outside Agra. The Shah Jahan had it built. He was a Mogul Ruler of the 16th or 17th century. After the city was finished, a major oversight was discovered. No water was available.

The Mogul Empire preceded the British. The British started at Calcutta as the East Indian Company (private). Military outposts arose to protect company. The British began to expand and to play one Indian state against another and sometimes got involved in battles. The Red Fort in Delhi is a remnant of the Mogul Empire. The common man probably had a rough time under the Moguls.

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Jan. 16 A few odds & ends. ~~Don't~~ Indians here show respect by holding their hands in an attitude of prayer under the chin & bowing. Beggars put on a great show of distress - as though about to die but a moment later may be laughing and in a state of full recovery - this is not to be taken as meaning they are not in dire need.

Jan. 17 Visited Dr. B. R. Seshachar, head of the zoology department at Delhi Univ. Discussed "guide lines" philosophy with him. He had following comments: The British were in nearly all departments in the universities in the early 1900s. In zoology texts like Parker and Haswell were in use. Emphasis was on descriptive zoology. Since then the British (U.K.) has shifted over to the new zoology but the Indians who replaced the British professors have not made such a change. Change has been impeded by (1) the heritage from the past and (2) inadequate equipment. There are shortages of animal space, experimental apparatus, etc. and the universities are in no position to do anything about it.

To illustrate how inadequate are the facilities, Seshachar mentioned that he visited a zoology lab. where they had a microscope but no slides showing

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chromosomes. None of the students had seen these structures.

Only a few schools are getting into the new approaches to biology. Seshachar mentioned the following: Banaras (on the way to Calcutta) - called Banaras Hindu University.

Professor Ray Chaudhury is engaged there in experimental biology and genetics.

Then there is the Annamalai Univ. in the town of Chidambaram. The professor there is R.V. Seshaiya. Finally there is Portonovo, a small place where they have a marine biological station. According to Seshachar these are about the only places that are up and coming.

Seshachar has been to the United States. He remarked that in India there were two kinds of people in the university - those who had been to the states and those who are trying to get there. He knows Itera, Mazia, Balaramath.

To illustrate how Indian science is lagging, he pointed out that in cytology, a field much in demand, there was still stress primarily on morphology and field work was largely neglected.

I was able to get some first hand information on the present distribution of the larger animals in India. The accompanying map brings this out.

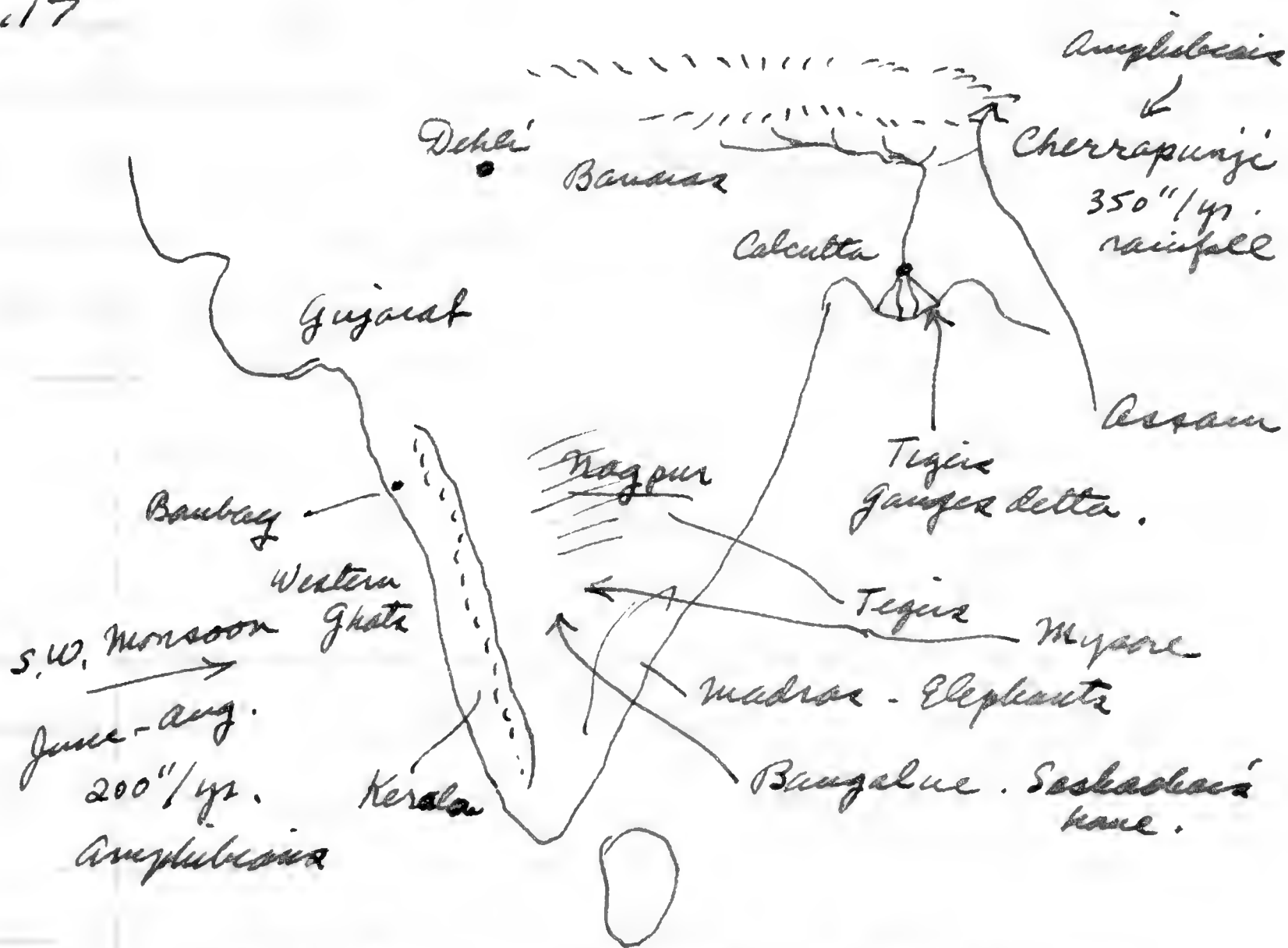
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Elephants are in Madras & Mysore

Kerala has elephants, tigers, and reptiles
and amphibians.

Lions occur in Gujarat - in western India.
No tigers there.

Rhinoceroses are in Assam foothills of
Himalayas.

Seshachar is a cell biologist and protozoologist.
He is also Dean of the Faculty of Science
and Secretary of the National Institutes of
Science in India. The latter corresponds
to the Royal Academy or the National Academy
of Sciences in U.S.

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Seshaschar feels that improvement in science must start at higher levels - in the colleges. It will later get down to the grade schools. He is very pessimistic about doing much very fast.

The Univ. of Delhi stresses graduate work. Around the University are satellite colleges. They are the ones that should be concerned with teaching.

To illustrate the poor training of science teachers he told about a recent interview of college teachers for filling positions in chemistry and physics in satellite colleges. The college principal and the chairman of chemistry and physics were present. The latter were shocked to learn that their own teachers had not even read the elementary books in their fields.

Delhi Univ. one of the best. Students are selected on the basis of the work and not on other considerations. Students are accepted from any state in India. No so in many universities... Student must be from the state in which the University is located. Seshaschar ~~also~~ asks, "How can we build Indian citizens this way or citizens of the world?"

There are some 40 universities in the country. These are of 3 kinds:

(1) Unitary University - both graduate & undergraduate teaching - Benaras is one.

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(2) Affiliating Univ. - Madras. Little teaching. Mainly conducts examinations. Seshaschar digressed to decry the closing coils of the External Examination as have so many others. Such Universities have few students. They may have a little high level teaching. Practically all the teaching is done by a cluster of colleges which look to the University for conducting exams.

(3) Federating Univ. These are just being developed. A number of colleges that teach both undergraduates and graduates. They complement one another and stress different fields - entomology, herpetology, genetics, etc. in addition to basic disciplines.

Postgraduate students circulate or teachers are brought to central point to handle them. The colleges form a cluster.

Seshaschar emphasized that the great spot in India is to get the bare necessities of life. Science is a luxury that must come later for the masses.

One problem in producing good science students results from the rapidity with which students go through school. This has an economic backdrop. Parents are averse for children to finish quickly so they can help parents.

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As a result students graduate from college when only 18 or 19 years old.

~~This is at a time~~ At a time when he is in need of guidance, he is on his own in the University and he flounders and must be spoon fed. If it is suggested that highschool be lengthened so that the student enters the University when he is more mature, there is a great outlay from parents. They cannot support them for this additional time. It is an acute economic problem.

As an example, Seshachar pointed out that he had an 18-19 year old boy who was studying for his Ph.D. He can't do a thing on his own. He asks for help at every step. 95% of the students are like this. As a result, Seshachar does not encourage students to go to the U.S. unless they have a doctorate. To sum up the average university graduate in India has gotten to his place too quick, too early, too young, to do independent work.

Delhi University currently has about 30 graduates in zoology and there are 17 faculty members. Only 7 or 8 of these have sizable graduate groups.

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Ocean Trip

New Delhi

Jan. 17 The pressure on faculty is not so much to publish (although it is there) but rather to get out Ph.D.s.

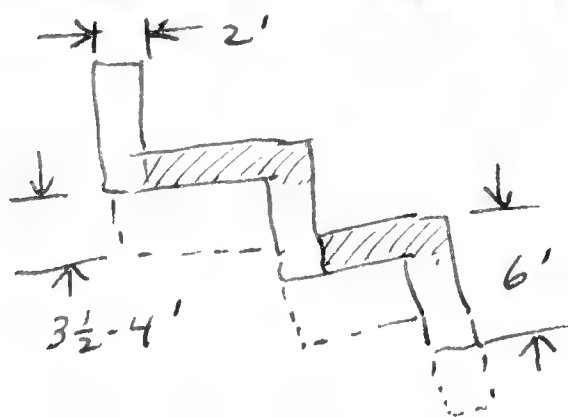
I then was given a brief tour of several labs. In one lab, I saw pairs of ciliates. The animals could easily be seen with the naked eye. Seshachar is studying the chromatin fibres of the macro-nucleus. In ~~the~~ another lab a young man (endocrinologist) was ~~introduced~~ introduced who has worked in the U.S. He has received \$200,000 from the Ford Foundation to study reproductive physiology. In another lab, a young faculty member was studying gonadotropins of the pituitary of a local cat fish. He had successfully gonadectomized his animals. Seshachar decries the shortage of space to keep animals. They are using one of the laboratories in the new zoology block as an animal room.

Seshachar laments the fact that so much zoology is indoors and wishes ~~more~~ more would be done in the field but he points out people don't like the field - where they may be uncomfortably exposed to insects, cold, wetness, etc.

I then went to the Red Fort area for photographic work. He was humankindly at a low level. In one rocky patch of ground

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perhaps, 100 yds, ~~less~~ I would estimate there were 2-3 hundred people, families living in perhaps 75 tents. The tents were little more than pup-tent size and patched & tattered. The people were in rags, tired looking & thin. There are many refugees in town because of the war. They may have been ~~from the~~ war areas but not all were mongoloid types. The place smelled of feces and one had to watch his step to avoid stepping on such. Pits had been dug (as sketched) but evidently were used half ~~heartedly~~ heartedly. At



one place some well dressed children were climbing in and out of one of these pits. Adults were looking on

~~permission~~ without protest! Great flocks of kites, crows, and vultures were present. Since it is not uncommon for live-stock to die in town (I've seen a dead cow and much bloated dead pig and several near dead dogs) there is plenty of food and the scavengers perform an important service. Here the birds and cattle looked in far better condition than the people.

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Asian Trip

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New Delhi

Jan. 17 I saw a group of 8 black water buffaloes walking single file with a tiny boy following the last one. The pale gray humped cattle were common. Miss Mason (who lives in Calcutta) told me that ~~during~~ death of cattle may be of more concern there than human deaths. I had heard that people may die on the street and be left for some time before removed. She pointed out that since so many people sleep on the ground with their faces covered, it is quite possible for a dead person to be considered to be sleeping and a man may begin to smell before his death is evident.

I went to the canvas covered roadside place ~~operated~~ run by the mongoloid (Tibetan) shop keeper who showed me the flint and steel set. He wanted 20 rupees for the set but I got him down to 12. Dart had told me the Indians & Tibetans expect to bargain and their first price is seldom held to.

Left for Karachi on Pakistan Internal Airlines flight 206 at 7:40 p.m. from Palam International Airport. Flight time in piston plane about $2\frac{1}{2}$ hours. No difficulties with customs. Taken by bus to Palace

Jan 17, 1963 Karachi, Pakistan

Hotel where airline had made a reservation.
 Enroute passed a rig drawn by a camel.
 Arrived at hotel about 9:30 p.m. Rate 50 rupees
 a day (about \$10.00) including meals, the
 same paid at Ashoka but the accommodations
 less plush but more spacious. A sign over
 the sink warns that the tap water is unsafe.
 Bath water is yellow with sediment - rust
 etc.? I'm not sure I get cleaner by bathing.
 a few mosquitos. Several got to me and
 I decided to go after antimalarial drugs.
 Malaria occurs here. Mr. Tucker the
 Scientific attaché at the U.S. Embassy is
 going to fix me up on this.

Jan. 18, Karachi

Spent an hour or so organizing a list
 of people I should see concerning my
 educational mission. Phoned ~~Mr.~~ Mr. John
 M. Tucker at the Embassy. He had offered
 to let Dart & I stay with him. He has a
 large apartment but since he thought we
 were coming later, had made arrangements
 to leave on the 20th. The Embassy is only
 a few hundred yards from the hotel at
 Chancery - 8, Victoria Rd. - Phone 5-5001/

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Asian Trip

Karachi

Jan. 18 Tinker has been with the Embassy only 2 months. His post has been created recently. He is retired from the directorship of Du Pont Laboratories (I believe in Maryland). He is a slight man of perhaps 65-70 and has 4 children, all in distinguished positions.

I briefly outlined my mission and he made an appointment for me to see Mr. Kenneth D. Clem, Deputy Chief, ^{Phone 45648} 55031/268 Education Division, US AID to Pakistan.

I saw Clem who is at the AID establishment some 2 or 3 (?) miles from the Embassy. He is a heavy set, dynamic individual who vigorously attacked the problem of my schedule. He brought in Mr. R. A. Quraishi, Educational Advisor to AID, a dark-skin intelligent man who had training at Columbia and Cornell in educational psychology. He has also had training in physics and has taught science. His wife is a biologist with a PhD in economic ~~for~~ entomology from Cornell. ~~He also had~~ Quraishi also helped with my schedule.

He mentioned that on the 19th there was to be a ~~not~~ meeting of APWA.

Jan. 18, Karachi
Pakistan

"All Women's Association which he thought I might wish to attend. It is to be at 3:30 pm. on the topic, 'Formation of man for the construction of peace.' It will be held at the Teachers Training College at Nazim Abad.

As to my schedule, we decided on one full day of secondary school visitation and the remaining 2 days to be spent in interviews. Schools tentatively selected are as follows:

Newtown (girls) - Principal Mrs. Safia Khan. Grades 5-10. (A Mrs. Morris of the L.A. City Schools visited there)

Sind Madrassa (boys) - Principal Mr. Nasser Hussain, Grades 1-10. ~~Frere~~ Frere Rd.

PECHS - Pakistan Employees Cooperative Housing Society College, (girls), Principal Begum (Mrs.) Majid Malik. Grades 6-12. Frere Rd. Major Bakhtiar, Chr. Sec. Sch. Bd. PECHS. American School (mostly American children). This school was suggested
Phone 41340

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Asian TripKarachi

Jan. 18 by Wm. O. Hall, Deputy Chief of Mission, U.S. Embassy. Hall is a big dynamic man, open and friendly, in his late 40s(?). I believe his children attend the above school.

The following people have been considered for contact but not all are available, I find.

University of Karachi

Vice-Chancellor - Dr. Ishaq Hussain Qureshi. Phone 4-3434.

Head of Zoology & Dr. A.H. Quadre
Dean, Faculty of Science Phone 43012/49

AID

Chief Educational Advisor - Dr. Lloyd E. Grunice Phone 42139/255

CENTO Field Coordinator - Mr. William Abbe

Deputy Chief, Educational Division

Mr. Kenneth S. Clem. Phone 45649

Educational Advisor - Dr. R.A. 55031/268.

Qureshi. Assist. Reiman-/256

Ministry of Education and Scientific Research

X no. Secretary - Dr. S.M. Sharif - Phone 5-0716
no Deputy Education Advisor (General)
Dr. S.M. Ali Phone 5-2686

Central Bureau of Education
no Director UNESCO Dr. G. G. Jordan Phone 7-2749

Planning and Development Section

Mr. Wali M. Zaki. Responsible for dev. of sci. ed. in Pakistan.

Directorate of Education

Director of Education - Dr. A.C.S. Gilani
Phone 7-0425.

yes
non.

Deputy - A. Mirzan Phone 7-1054.

A.H. Chotani, Secretary of PSCIR,
PASSP

Chairman, Pakistan Council of Scientific
and Industrial Research.

yes
non.

Dr. Salimuzzaman Siddique -
Lab. Office
Phone 51551 or 52104.

Mr. Piracha UNICEF Secondary School.

Dr. Raziuddin Siddiqi Vice Chancellor
University of Sind Hyderabad.
Science Advisor to Ministry

Asia Foundation

yes

Representative for Pakistan, Curtis 54. J. M. I. Shah
Farar Phone 71770 Abdul Latif Rd.
(Aziz Mangil)

yes.

Deputy - James Porterfield Phone 72203

Summer Institute to be conducted by Dr. Wm
Monel.

Ford Foundation - Rook Court, Victoria Rd., Karachi 3.

no

Representative. Mrs. Haldor Hansen
Phone 51179

Assistant - ~~Mr. Donald C. Long~~
~~Phone 51174~~ G. Schimmel.

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Embassy

Ambassador - Walter P. McCaughy.

Deputy Chief of Mission - Wm. O. Hall.

Economic Section - Arthur Bauman

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U.S.I.S. (In the Chancellery)

Dr. Jack Bryan - Phone 5-5081/435.

Tied in with education here. Call
mon. & Tues.

On Fulbright board.

Peace Corps

Karachi Embassy

Mrs. Shannon - available most any time.

U.S. Educational Foundation in Pakistan

83/1, N.I. Lane, off Garden Rd.

Phone 7-0335 & 7-0338.

Director - John Allen Smith.

PANS DOCS - Branch of PSIR - Scientific & Research
Documentation Center. For small sum gather scientific
scientific data. Sponsored by UNESCO.

Jamia College - Malir, beyond air-

port. Trying to continue Muslim
educational development that started
in India to integrate science into
curriculum. Teacher training institute,
degree college, intermediate college,
secondary school, primary &
kindergarten.

Jan. 18 Karachi

Car Hire - Akbar Ali -
Phone 52051 - 50 rupees (\$10)
for day 8:00 am - 8:00 p.m.

A few odds & ends since arriving in Karachi: A gratuity is a "bakshish." A "Mullah" is a Muslim ~~scripture~~ religious leader who calls the people to prayer. They call from towers, now with the aid of loud speakers. Calling occurs 4 or 5 times a day at which times the devote spread out their ~~prayer~~ prayer rugs and face Mecca. There is less of this now however in the cities. I have noted the call at 5:30 a.m. & 5:30 p.m. It is a long wailing sound that rises & falls in pitch.

Rate of exchange here about like at Delhi with money here equivalent to Indian rupees. No naya paisa, just paises. At Palace Hotel I got 22.40 rupees for \$20. I believe the paymaster tried to cheat me. He counted out 90 rupees then sat back. I stood waiting at the window. He then gave me the rest.

Mr. Tinker said there were 30-40 colleges and over 100 government and private schools in Karachi area. In E Pakistan about 90% of the schools are private. In west Pakistan about 60%.

Dr. Mrs. B. B. Quraishi, the wife of the AID Educational Advisor is Principal of the Government Intermediate College for girls

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Karachi

Jan. 18 Grades 11-12. - Frere Rd.

The 4th Annual Science Fair ended just a few weeks ago. Siddique involved.

Like Delhi this place swarms with kites (chale), term also used here, and the gray-mantled crow. There is less respect for bird life, however.

The tricycle taxis are here, very ornately decorated with plastic colored patterns and bright paint. Dr. Tucker says ~~these~~ they're dangerous - many accidents.

The country ~~is~~ is absolutely flat in the city. The climate is dry - I think Tucker said $\approx 6\frac{10}{10}$ inches of rain a year - when Monsoons come in June. Sun rises & sets without few cloud effects during the dry season.

I've seen bands of sheep & goats, marked with colored dyes.

Jan. ¹⁹~~18~~

Picked up by James Porterfield of A.I.D. Spent some time at his office talking about my mission. He is not very happy with his post. He's concerned with the widespread dishonesty of the people which may have bearing on science teaching. Porterfield got his degree at Calif. Has been in Karachi 10 mos. Has an attractive wife & 2 baby girls. Lives in a southern Calif. ~~house~~ style home. Very nice.

Jan. ¹⁹~~18~~. He told about AID's summer institute program which is in its 4th year. They brought out 6 men last year & will bring same number this year. Institutes last 6-8 weeks & deal mostly in science. Topics always include English and have included chemistry, biology, and geology. Also may have work in political science, economics and political science. One foreigner & two Pakistanis head up institute sections.

Schools have been up into Primary, Secondary, Intermediate & College. ~~Learn~~

Learned about women's dress. The "Borka" hangs over face & most of body. The "Shalwar" is the pants, The "Kamisa" is the shirt. My spelling here is phonetic. Many women no longer cover their faces.

Got a picture of a group of curule carrying ~~that~~ grass. A lady was sweeping the street behind them.

Porterfield drove me out to the new University site 12 mi from Town near the airport. Sprawling campus, designed by a Frenchman and looks it. Housing units in service from "lowly" students to faculty & built accordingly. Much natural growth on campus -

Stebbins, R

Aspen Trip

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LarachiJan. ~~18~~¹⁹

mesquite like tree, great rounded cactus clumps (look like rat-tail cactus of SW U.S.), grass, a large milkweed - 6-8 ft high. A grass fire was blackening a nice patch near some of the building. Ideal outdoor laboratory here with numerous birds (I saw some 10 species in 10 min; without careful search), lizards (not seen), etc.

Colorful flags among "mesquites" at one place designated as place where saint lived or died, according to Potterfield.

All buildings have numerous openings - a naturally air conditioned. Bañancas suggested badlands of parts of New Mexico. The University was in session. The men most wear black academic gowns - no tight pants.

On way back to ~~the~~ town saw samples of water logging and saltation problems. Water table very high, aggravated by canal deploy of water from Indus, farther north. At many points water stands at surface. Used by water bufflo, incidentally. It is brackish. So much water in soil plants do not do well. There is

Jan. 19. a plan to put down wells & pump water out to Indus. Evaporation results in salts being deposited near & at soil surface, also bad for plant growth.

Vegetable growing area in outskirts of town.

The big black water buffalo is a key animal in lives of people. It provides milk (and I guess meat) and fuel. The cow pie "patty cake" industry was seen nearly everywhere. The dung is gathered in rounded piles, then patted into flat cakes 8" across & 1" thick at center, spread out to dry in close formation, stacked in groups of 2 or 3 on edge, leaning together to aid further drying, then loaded on carts & sold as fuel. At one place ~~there~~ were about 50 animals & the cow pies were spread out over an area 30 x 200 yds. Evidently only the women make the pies and it starts early. A baby

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1963

Asian Trip.

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Karachi

Jan. 19th perhaps 3-4 years old was seen playing with great energy. The men do the weaving - lucky fellows.

After a pleasant lunch at Patefield's, drove out in his Volkswagen bus to garbage dumps near a place called the honey moon house (a house on one of the few hills here) not far from the great sprawling Jinnah Hospital. Here I got marvelous shots of huge black vultures, so gorged they ~~could~~ could scarcely fly, smaller scavenging ~~for~~ birds of several kinds, some apparently the young of the black species, pye dogs, and kites. Great wheeling column of kites numbering perhaps 300 birds was rising over an area of brackish pools but they drifted off too fast for a picture. Several fights were seen among the vultures and dogs. People also dump about through the garbage.

Went to Mr. Tinker's for dinner. Arrived early so walked out across the mud flats near his home. The soil was pretty well dried out at the surface and cracked underfoot. Two camels were feeding in low-growing mangrove(?) growth. These plants are perhaps 3-4 ft. high here. I've been told the walking fish, Periophthalmus

Jan. 19th is here. Saw ant hills. How can the ants tolerate the waterlogged ground. Most of the hills were higher than the surrounding surfaces and perhaps the burrows to not go deep.

Saw a red dragonfly about $1\frac{1}{2}$ " long, resembling those seen in Calif., ~~a~~ lizard tracks on elevated areas of fine white sand, the skeleton of a cancer crab 4" wide. I'm told there are sand dunes in the area. Saw several clumps of Salicornia (?).

Spent evening in the Teakur palacial residence ~~at the~~ (2 stories high). This area is the "Belair" of Karachi. Industrialists, businessmen, politicians, etc. have homes here. One industrialist put up gaudy tent and lights for his ~~sons~~ son's wedding. It must have cost thousands of rupees and the whole thing lasted only 2 hrs. The president (Khan) attended.

The Teakurs showed my slides of their trip to Alaska — Wilmington, Delaware to Anchorage, by private plane — they both fly and their oldest boy is also a good pilot.

~~To return to the University trip — the country side suggests New Mexico or Arizona. The big mill used was~~

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Karachi

Jan. 20
19

Day spent in picture-taking, both movies and stills. Went out with Monic Acketar, the young lawyer and a driver from the Asia Foundation in a microbus (Volkswagen). Excellent for photography because ~~front~~ wind-shield could be lifted and I could shoot out the front with nothing to obstruct the view. Jim Porterfield turned over car and driver (at no cost) for the day.

Went first to the railroad station. Photographed people getting off the train. Many types and great variety of dress. People seen carrying suitcases, bed clothing, etc. on top their heads. Finally a policeman sent us on our way, saying the station master objected.

We then went to the docks where I got shots of sailboats. It was Sunday and people were taking rides for pleasure. After leaving Monic said with a grin, that it was a restricted area.

Went to a place called Dhobig Ghat where hundreds of native men and women were washing clothing. The site is along a broad water course surrounded by arid lands. A strip of green follows the stream and a crazy quilt of sheets, etc. - white, ~~red~~ and all colors was spread

Jan. ²⁰~~17~~ out on the ground for $\frac{1}{4}$ - $\frac{1}{2}$ mile.

Row upon row of clotheslines strung with garments, sheets, and other articles of cloth were seen. The clothing fluttered in the morning breeze. Concrete troughs and sloping trays were the washing units. The clothes were dunked in the troughs and then wrung out and slapped, with a vigorous over-the-head movement, against the tray. The place is in an extremely poverty stricken part of town with hordes of ragged dirty people. When I tried to give a camel caravan driver $\frac{1}{4}$ rupee, a small boy snatched the money and soon there were 20 children fighting for the coin. "Bateshish" was the inevitable greeting whenever we went.

We drove to ^{Mangho} ~~Mango~~ Per, ^{Shrine of the Mangho Sultan,} to see the crocodiles but I decided against a picture. The overly fat pale gray beasts were in a stone fenced area 40 - 100 ft and showed practically no signs of life.

The water was a deep green with algae. The area is famous for its sulphur springs.

Went to Hawks Bay on the sparkling Arabian sea. Two rupees required to enter the area. We passed through an airforce base enroute. Had a quick hamburger lunch with the Porterfield and Farners.

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Sent Monir and the driver off with 16 rupees for lunch. They sent us over two snake charmers. It cost me 6 rupees to get a picture of the charmer squatting on the sand and playing his pipe. The sound suggested bag pipes. The cobra (black in color) was in a little basket 10" diam. by 3-4" deep. When the charmer took off the lid and hit and the animal with ~~closed~~ his fist, the snake would rear and spread its hood. There was little swaying. Several times it struck ineffectually. I understood the mouth is sewed closed. The man wanted more money but we sent him off. He said he charged 2 rupees to Pakistanis and 10 rupees to Americans. The other "charmer" had a mongoose & python. A fight of a cobra and mongoose may take an hour, so I decided to miss that one.

I took a camel ride — not very smooth. When the animal ran I about got the wind bounced out of me. Getting up and down was like a seesaw. The driver complained over 1 rupee pay but I was told by my hosts that I should not pay more.

At 2:15 p.m. headed back toward

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town for more pictures.

Monis is a handsome, dark-skinned black-haired fellow. He said today was a great day for him. He had just gotten a raise of 130 rupees a month and ~~he~~ was having a great time helping me take pictures. I asked him if he had a girl. He said Pakistanis do ~~not~~ not have girls like we do in the U.S. When marriage time approaches, a girl's parents are given a photo of the boy and his credentials, by the boy's parents. The girl decides if she is interested. The ~~boy~~ boy tells his parents what kind of girl he wants. Monis had requested "a slender pretty girl." The engagement is thus arranged before the young people see each other. After going together for awhile they may decide they don't want to marry and may break off the engagement. Divorce is possible but rather difficult because of social pressures.

Monis had another explanation for the flags referred to by Porterfield. He said they marked families that had lost people in the war in India in 1875. There were uprisings against the British then.

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After assorted photographs in town, including a group of fellows with water-filled goat skin bags, we drove to the refugee camp ^(out the Kohangi Rd.) about 8 miles SE(?) of town. These people have come into the country since partition, when most ~~Indians~~ Muslims left India. Here we got shots of water buffalos, cattle and more "patty-cake". Our driver does not hesitate to swerving off the road and across country to help me get pictures.

Returned to my hotel about 4:30 p.m. after a truly wonderful day.

Postscript - Monica has been through the school system here. It goes as follows: Primary (4-8 yrs. of age), secondary (8-12), higher secondary (or intermediate) (12-16), college (16-20), university (20-22).

Matriculation is at the end of the higher secondary. Performance on the exam determines whether a student may go on to the university. Primary and secondary school children all must take "general science".

In college students going into medicine take chemistry and biology, those going into physics or engineering take physics and math.

Monica told me the tree I have considered to be a strangler fig is called, "repil".

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This should be excellent country for field work in biology. In the outskirts of town is wonderful reptile country and interesting desert plants & insects. Birds are plentiful in both town & country. There must be fossiliferous rocks.

Incidentally, the English sparrow is here in the city.

A new natural gas field has been discovered, which is regarded as a great boon. Not far from the refugee camp at Koranji, I saw an oil refinery with a tall stack with a gas flame, ~~burning~~.

In the outskirts one sees occasional oases of what looks like a date palm. Oranges are common in the market places. In India we found they called Tangerines, oranges.

There follows a few comments by Jim Paterfield. Jim is a youthful person, perhaps 28-30 yrs. old. He mentioned Morrel of whom I have written earlier. An MA here - an inferior AB, Asia Foundation summer seminar - Pakistan Association of Scientists and Science Professors involved. Started out as labor union group. There was fear the organization might be taken over ~~the~~ by the communists, hence labor union aspect deemphasized. Organization runs science fairs here.

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Jan. ²⁰~~17~~

A subcommittee of science education has been formed. It is chaired by Dr. Nazir Ahmed who is rather ineffectual. The committee has arranged popular lectures in several cities. If organization becomes effective and healthy, Asia Foundation will support it. The Foundation has been trying to get PSSC and BSCS materials introduced. Sharif is the impediment. ~~When~~ Report of Commission on Nat'l Education was accepted (essentially) and 3 year college^(?) program was instituted. At the beginning of the 3rd year of the program students noted. Evidently want easier educational program.

President Khan came into office in 1958 - by usurping power. Country was put under martial law. He introduced a new constitution in 1962.

^{Porterfield}
~~James Porterfield~~ does not feel the people are communist oriented yet at the same time they don't want to be dependent on U.S. aid. Much of our aid is designed for long term benefit - such as development of resources and its effect is not readily seen by common man.

Karachi is ~~increased~~ to a considerable extent a refugee city. It went from 250,000 population in 1945-47 to its present $2\frac{1}{2}$ -3 million. Natural ^{rate of} increase is also very high.

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Off at 8:45 a.m. to AID to meet with Dr. Quraishi (pronounced Qwarēshi) on arranging my schedule. Since Quraishi was somewhat involved with another matter his secretary, Mr. Mohammad Habib ^{Rehman} ~~Rehman~~, helped out.

The latter proved to be a most helpful, frank young man. He pulled no punches concerning his country and was much interested in what I had to say about the world population problem. Through him and my driver (loaned by the Embassy) I learned that some 9 million refugees had come to ^{W.} Pakistan from India since partition. I learned the following numerical terminology. 1 ~~lakh~~ ^{lakh} = 100,000; 100 ~~lakh~~ ^{lakh} = ~~100~~ 1 crore; 1 crore = 1 arab; 1 kharab = 100 arab. (accent on last syllable - arab'). The driver said a dam is being built on the Indus that will cost in rupees, 1 arab. It is going in near the Jalal district of Punjab. Three or 4 others are to go in later. He said that W. Pakistan had good land, ranking 5th or 6th in the world in fertility but water is a big problem.

Q.H.K.

Visited Major, Bahhtairi, Chairman, Board of Intermediate and Secondary Education. He was ~~of the Secondary School Board at Pakistan~~ PECHS.

Employees Cooperative Housing Society College PECHS. He was a man in his late 40s or early 50s, polite but reserved and rather formal, no doubt a reflection of his military experience. A Mr. ^{Hammad H.} Siddiqi, ~~the~~ ^{board} Secretary of the ~~board~~ ^{board} ~~did not get~~, sat in on our conversation.

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Jan. ~~20~~²¹

Bakhtiar gave me 1 hr. & then said he had to excuse himself for another meeting. At times his mind seemed to drift off the subject at hand and I seemed less able to get across the nature of ^{my} mission than I have with other people interviewed at higher levels. He seemed most interested in stressing need for equipment and classroom space. He pointed out that they were on double shift, each shift 4+ hrs., and that classes of 40-60 students were common. There could be little individual attention to students. I stressed the desirability of working with native plants & animals and the value of field trips that stressed careful observation and quantification. He wrote himself a note to the effect that this could be tried and urged that I send him ~~a~~ guide material I might develop along this line. I described how I had been experimenting with simple measurements of plant growth, plotting of plant distributions in quadrats, with children outdoors, to help them ~~get~~ sense the point of view of the scientist. and indicated that our "guide lines" document was designed to encourage use of both the indoor and outdoor laboratory in science teaching. He asked that I

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said him a copy of "guide lines" for review. and also that I provide him with a statement as to the purpose of my trip. He evidently has in mind some publicity concerning my visit.

He said he had been in the U.S. on a ~~leader~~ leaders exchange program in 1956.

He pointed out that the Pakistan Curriculum Committee Report on ~~Secondary~~ Education had stressed the importance of science training in the ~~secondary~~ schools, and that it had recommended that it be compulsory from grades 3 to 10 and thereafter elective. However, either a shortage of teachers or equipment (or both) ~~in some areas~~ led to making science optional in some areas. Teachers of science may have a professional course for 9 mos. and may receive the teacher training from a teacher training institution which provides them with ~~some~~ experience in methods of teaching. Bakhtiar then again returned to the great need for additional space and equipment and said these shortages led to stress on theoretical side of science.

Mr. ^{Hammad H.} Siddiki suggested it would be helpful if, as a result of my trip, a comparative survey of ~~the~~ south & southeast Asian education could be prepared and circulated. He said they would be most interested in such a report.

I visited Dr. Salimuzzaman Siddiqi, Chairman of the Pakistan Council of Scientific and Industrial Research.

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He is a heavyset, short, broad faced, kindly gentleman in his sixties, I should say. He listened attentively to my description of "guidelines" and expressed much interest in receiving a copy for study. He thought it would be most useful and that although somewhat outside his area of activity would do what he could to encourage its use. An alert, bearded, young physicist was present throughout, Dr. M. M. Qureshi, who is head of the physics division. He has a PhD & DSC and sounded like an Englishman, although a dark-skinned Pakistani. He seemed very excited by the approach of guidelines. These men are both interested in popularizing science and are involved in the publication of a magazine called "Science Chronicle", copies of which they promised to send me. Siddiki writes ^{science} books for 4-10 year olds and was much interested in my description of the "tooth pick caterpillar" game I devised to introduce the concept of natural selection to 5th graders.

They told me of PASSP - Pakistan Assoc. of Science and Science Professors, 39 Garden Rd., Karachi. At the Pakistan Council of Scientific and Industrial Research headqrs. where I visited Siddiki, there are a number of buildings grouped about a quad. Several

3. Hon. W. J. Phelps Bldg.
1000 ...

Shoreland ...
... **Head of Biol.**

Mr. ...
... **Dept. Bot.**

Home ...

Mrs. ...
... JANOPAS. ...
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Oradif Cheosabul

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Chalalongkorn Road.

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General General

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Thammasat Road.

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Source Report -
10 days physical exam.
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Source for

John J. Lucas
with Francisco

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contained horses and were devoted to veterinary research. Another was involved in drug research.

Mr. Reisman explained the custom of the covering of the women. The prophet Muhammad urged it to prevent sexual lust and attack. Reisman said he would probably be in bad standing if a religious leader heard him say that but ^{he} believes it is true. Women are uncovering their faces by stages. Some now expose the eyes, some the eyes & nose, and some the full face. I have seen some "borkas" with two square "windows" covered with netting to permit vision. Others may have a single broad "window". Some borkas are white, some black.

In the afternoon I visited the Government Intermediate College for Women on Freie Rd. a few miles from my hotel. Mrs. Ouraishi is the principal. She is a sweet, graying woman of 45-50, of gentle and dignified bearing, stocky in build. She did her PhD on a grass insect and is a biologist with a Cornell orientation toward field biology. She spoke with enthusiasm of Dr. Wright, Hamilton, Ramey and others at Cornell. She has gone on bird trips with Allen.

She has written science books for children and has one which describes how they may go to a pond outdoors,

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Jan. ~~20~~²¹ collect sample plants & animals and set them up in the laboratory in an aquarium. We found we had much in common with respect to our educational viewpoint. She agreed fully that much can be done in science by a good teacher even without equipment.

There are 605 girls ^{13-18 yrs. old} in the school, dressed in green, black & white uniforms. All stand whenever the principal walks by. The girls were all black haired, dark skinned, dark-eyed and most were slender. Grades are 11 & 12. Both the arts and sciences are represented. Girls in "science" take physics or engineering and end up, if successful as medical people or teachers. They must have 1st division marks (60% or more) to go on to the University. The art block of the college offers home economics, geography and math, as an elective. The Science block - physics, chemistry, biology, and math.

When a woman finishes in physics she can go on to the Univ. for honors course.

The school gives a diploma on completion but students may go on in the degree college, located in the same school for a BSc in science or an AB in the arts. The degree college operates in the morning. Those who only get a diploma in science may work as lab technicians or assistants.

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BSC people can teach science. Some students go into medicine after receiving the BSC.

There is a trend to teach science in Urdu.

When I asked to what extent the schools emphasize quantification and measurement, she gave me the answer I have heard repeatedly — many schools are not well equipped. The outdoor laboratory approach is limited by transportation problems.

Visited laboratory which began work at 4:00 pm. Zool. lab. Synoptic collection of animals representing major taxonomic groups. Many from Turkey but more recently obtained locally. Local fish, sepia, insects, reptiles, etc. have been obtained. Uromastix is dissected as a representative lizard type for BSC. Saw a few stuffed local birds and a cobra but all were mounted badly. College started in 1949 and at first depended on outside (foreign) sources. Now local dealers are preparing plaster models of organs (heart, etc.) dissections, etc. Saw plaster frog and rabbit dissections. Freshly killed pigeons are dissected. Saw a jar full of live liches to be used in study. The school has a collector who goes after material. The approach in zoology appears to be morphological & taxonomic but a good feature is the use of local

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Jan. ~~20~~²¹ arrived.

Also visited the botany lab. where I saw preserved marine algae, pairs of grains & other seeds. The children are taken on field trips and are encouraged to write ecological notes but they often get carried away by collecting and are lax about the notes.

Also visited the physics lab & observed the girls working with magnets and apparatus to plot lines of force.

In the chemistry lab. the teacher put on some fireworks which she is preparing for some program coming up. Again there were many dust covered bottles with aging labels suggesting little use. The room was poorly lighted. The arrangement of work benches was as noted in the school in Delhi. The chemistry & physics

~~lab.~~ labs. visited were large — perhaps 60-70 ft. x 40 ft. The life science labs were smaller. A long hall-way like work area bordered each lab and was set off by a solid wall with doors at intervals. This hallway was well lighted by a long bank of windows and a continuous length workbench ran the length of the "hall". Sinks were spaced at intervals along the other side of the

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(Zool. hall = 50)

hall. Lecture rooms seated 50 + students & there seemed to be ample blackboard space. A large auditorium was seen which could be darkened for movies. A student's lounge with colorful couches and a table tennis ~~range~~ arrangement was seen. Nearly all rooms were painted white inside, I presume to help illumination. No terrarium or aquaria were seen.

A great flock of the gray mottled crows were seen in the quad. When I suggested they would make a good study, Mrs. Quaraiche said the girls would not be interested because such a study would not apply to their exams.

There are two exam papers. in zoology — one on vertebrates & one on invertebrates. There are "internal" & "external" questions. The University sets the standards of the "external" exam. The student is given 4 or 5 questions to write on in 3 hrs. Usually he has a selection of questions. There are also practical "internal" & "internal" exams. When an exam. is given, a University person,

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the teacher and a supervisor of examination administer the exam.

Internal exams for degree classes count 25%. They consist of written tests and tutorials, the latter oral reports to class or teacher.

I asked Mrs. Quraraishi about the "Mullah". She said the caller is called a "Mozan" and the call for ~~prayer~~ "Azan".

In the evening I went to Wm. O. Hall's residence, Deputy Chief of Mission, for a party. The affair was for military personnel - all high brass - air force, navy, army, evidently U.S. people brought from London to this area for familiarization with the Asian setting - I presume, should the command shift to this area. Some 50 people present - all men. Only about 5% were local military, including some Pakistanis.

Met a Capt C. B. Collins, U.S.N., who had had World War II experience on a ~~destroyer~~ destroyer, He was sunk off the Solomon Islands & lost over 50 men.

His son is interested in fish and is in the American school - a boy of 15.

Collins is on the school board.

(Home phone 40833; Hic 20041/53).

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Mr. Hall is hopeful I will be able to visit the Karachi Grammar School.

Mr. Dolman is principal.

Hall's address is No. 3, Golf Club Rd., Karachi.

Met a Mr. McDonald of AID who agrees with the quantification approach to secondary school science, involving use of merger quotient in areas such as Karachi.

The Education Commission Report states that religious training in the schools is to be mandatory.

Rehman says the Kaku has declared birth control as essential, despite objections of religious leaders.

Jan. 22 With Dr. Quraishi, I visited the

Pakistan Employees Cooperative Housing Society College (PECHS), Begum Majid Majid Malick principal. The school takes children from preschool age to the 12th grade. Mrs. Malick is a most delightful person. She is a stout woman in her late forties (?), round faced, jolly and graying. She spoke excellent English. She is obviously well liked by her staff and students. Quraishi said he always liked coming to her school because something new was always happening. Although she is not as fully trained, he said as many principals, she is the very best because she has imagination, good will

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Jan. 22 and a keen intellect. Again the children were in uniform. Both boys and girls were together. Ouraishi explained that they were separated in Pakistan schools at preadolescence. The school was a two-story stone & mortar building still in the process of construction, built around a quad, recently planted to wire (?) grass.

Some classes have been studying archeology and trips have been made to excavation sites along the Indus. Plaster casts have been made of artifacts.

Visited the science laboratories in chem., physics, botany, and zoology. In physics lab. saw careful drawings of Wheatstone bridge, and other circuits. The students were working on problems in electricity and were studying in pairs. Table tops were of plastic, there were plenty of balances. The lab. was perhaps 60-70 ft. x 30-40 ft. Wall cabinets contained glasses, and a variety of physical apparatus. There was a static electricity machine. The lab. and its physical composition seemed to be at a high level.

The chemistry lab. was of similar size. Bunsen burners were in use and the chemical containers looked newer & as though the lab. were in more use.

Jan. 22 than in other schools visited. Work benches were in good condition.

In the zoology lab., 50 x 30 ft. (?), the students were completing drawings in their notebooks. One girl was stippling a drawing of an amoeba but was not examining a specimen. I gain the impression that stress is on art rather than direct study of animals. There were many excellent drawings. Each student had a printed syllabus which guided by questioning, an understanding of animal morphology. The students start with vertebrates and then go to invertebrates. They study the structure of a variety of representative types - rabbit, frog, pigeon, earthworm, cockroach, etc. An exercise on the parts of a microscope was seen. Labours, & carefully executed drawings had been prepared - shaded and labelled. Their bright young teacher ~~said~~ said that function was covered in lectures - structure in the lab. Pakistan animals are used. Local firms had made plaster models of frog dissection, life history stages of the frog. A large number of wall charts were seen, many of which were foreign manufacture. There were wall displays of foreign butterfly life histories (in color) - probably British species. A sadly stuffed pigeon, and rabbit were seen and the principal said they had a person who does this sort of thing and she wants the students to learn the techniques.

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Jan. 22 The botanical laboratory was along similar lines - stress on drawing and structural & taxonomic aspects. The teacher did say, however, that the classes go into the field and collect & write notes. Plant specimens mounted on cardboard and covered with cellophane were seen. Locality data were lacking in precision, however. Botanical specimens preserved in formalin were seen. Stress is on the local flora.

Visited an art class. The children were working in pencil and were learning shading. A group of small children in the same room were cutting and pasting colored paper mockups of human figures.

In the school yard was a group of 10-12 children being taught to play flute. This school seems to stress the esthetic aspect of life. A study of weaving is being started.

Mrs. Malick, did say, however, that she was planning to set up some live animal exhibits. No aquaria or terraria were seen.

In the library I saw copies of "The Young Observer" by ~~M. Martindale~~ A. Allcott and "Nature Rambles" by M. Martindale.

I suspect that this is one of the top schools in the country.

Jan. 22 Ourarishi urged that I write Mrs. Malick a letter of thanks.

We went next to the New Town School, a girls school. The medium of instruction is Urdu. Ourarishi feels that science should be taught in the native tongue because the children think in their native language and thus gain a better grasp of concepts, etc. Mrs. Mumtaz was in hand to receive us and several sweet girls, 12-13 yrs. old, one a very bright youngster - the president of the student body. We were presented ~~on~~ ^{flowers} for our lapel. Again we visited classrooms and the single all purpose lab. which handles, chem, physics, and biology. A chemistry class was in action. The girls were dressed in colorful uniforms of varied style.

The girls assembled in the auditorium, sitting on the floor. I was formally introduced and asked to talk to them. I stressed the point that science studies need not require fancy equipment and that much science can be done outdoors with birds, insects, plants by applying measurement techniques. Dr. ~~Ourarishi~~ Ourarishi followed in Urdu and I presumed helped clarify my points.

These Pakistani girls darken the edges of their eyelids and often put a black line in the outer eye corner, ^{a line} that turns upward at an angle. Sometimes a fairly broad area of the lower lid is darkened.

We were shown "science fair" projects -

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Jan. 22 a cardboard house with burglar alarm, a door bell buzzer made from coil of copper wire and a nail, and other electrical gadgetry. Some blown egg shells with drawings of animals depicted evolutionary stages - a cardboard man stood in the center surrounded by the shells. Not much true science here.

We stopped off at the Central Bureau of Education, Ghafur Chamber, Victoria Rd., director M.M. Hasan. He would like a copy of "guidelines" for evaluation. Graphs in Mr. Hasan's office showed the number of primary schools in Pakistan to be about 4500 in 1959 and the number of secondary schools to be 6000+. Primary school enrollment was 45 lakhs + secondary 13 lakhs (1959).

Ourarishi commented that the teachers have such heavy loads that their energies are drained and they have little time & incentive to become imaginative in their teaching. Many are distracted by worries. He feels the educational system must think in terms of the average, not the ideal teacher.

I then went to the Government of Pakistan, Ministry of Education and

Jan. 22 Information. Education Division, to see Mr. Wali M. Zaki who is responsible for the development of science education in Pakistan.

Zaki is a man in his late 20s or early 30s, efficient, intelligent. I found him one of most valuable contacts thus far. He had skimmed through "guidelines". He is completing his PhD work under Watson ~~and~~ at Harvard. All requirements have been completed, including defense of his thesis. He is now writing up his results. He has made a survey of science teaching in Pakistan. Of particular interest to him has been the effect of religion on attitudes toward science. He spent a year at Stanford under a Shell Oil grant. He worked there under Paul Hurd in 1960. He certainly has the point of view toward science that we wish to see developed and which is emphasized by "guidelines".

He feels the "guidelines" ~~manual~~ will be of great value to Asians but to be successful it will have to be tied in with specific programs. The U.S. has more uniformity in its approach to science than Asia. Books, teachers, socio-economic background of children all have more in common than in Asia. There is great variety in Asia. The manual may be too sketchy & too broad but Zaki stressed that he had given it only a cursory examination. Perhaps there will need to be several versions. British tried to write a science series for all tropical countries but I gather (by implication) that they were not very successful. However, as I pointed out to Zaki, "guidelines" presents recommendations on procedure, not ~~under~~ so much specifics.

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Jan. 22 topics to be studied as did the British series. He did feel, however, that we should slim down the size of the manual.

Stressing the shortage of satisfactory science teachers, Zaki pointed out that there are 2000 High schools in ^{W.} Pakistan and only 300-400 qualified science teachers. These would be teachers with a BSC and a Bachelor of Education (BED) degree. The remaining teachers are unqualified.

As mentioned Zaki has measured the science understanding of Pakistan teachers. He showed me sample questions used in the test. Part of his test was drawn from a U.S. survey; the rest he devised. Results were analyzed by computers in the U.S. His sample included 25% of all science teachers in Pakistan and all the science teachers in the teacher training colleges.

One of his most important findings was that in general religious people have little grasp of science and science oriented people are usually not religious. Since religion is mandatory in the schools, this will ~~will~~ adversely affect the progress of science training. New teachers are more religious than older ones, according to his survey. This result at first seemed surprising but it is a consequence of the fact that there has been some 15 years of formal religious indoctrination in the schools.

Jan. 22. The country is faced with a serious dilemma. It will fall apart without religion, Zaki feels, yet religion will impede scientific and technological progress. The Islamic effort on religion is the one thing that binds the people. Without it the Nation would disintegrate. Zaki feels the only way out of the dilemma may be a watering down ~~in~~ religious dogma. An example of how religion can bar progress is the attitude religious leaders have on birth control. ~~The~~ An objective scientific evaluation leads to the conclusion that the health of the society demands a reduction in births, yet religion says "no".

I asked if scientists, educators, and secondary school teachers were beginning to collaborate in efforts to elevate the level of science teaching as has been happening in the U.S. Zaki said "no" but that he was trying to get such collaboration going with the ~~help~~ help of the Asia Foundation & provincial governments. He spoke of them (collaboration groups) as "cells". He is obviously very familiar with BSSC & PSSC work. Indeed, he has worked with Zacharias at MIT.

I am coming to feel that one of the most effective things for the United States to do to help Asian science education is to bring high quality young Asians to the U.S. for training in science education.

Jan. 23. Visited the Sind Madrasah School. Nasir Waseem, principal. This is a boys school that covers 5-10th grade. The enrollment is over 1200. AID is putting money here to encourage diversification in teaching - shop work & other

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KarachiProvincial Education Admin, W
Pakistan, AID

Jan. 23 Technical training. Mr. Clem and a Mr. Alois & Hardee, formerly of Bakersfield, Calif. came along to see how AID money was being spent.

No lab. work given at present in biology - only theoretical presentation - lectures & blackboard drawings which the boys copy. One wonders how worthwhile such an approach is. Teachers put on demonstrations. School on tight lab schedule. One large, poorly lighted laboratory. Half class working in chemistry & half physics. A student puts in lab. time in both subjects each week - $1\frac{1}{2}$ hr. each. Economy dictates such simultaneous use. Lab. going almost continuously. Fluorescent lights mounted high overhead where rather ineffectual. Windows with scaling black paint. Very gloomy atmosphere. Lecture part of room separated from lab. by storage cabinets. Main blackboard area at back of classroom, behind fixed desks.

This is academically one of best schools in area. 90% of the boys pass their board exam.

Saw also typing class, class in electricity, and woodworking tools. A garden area was seen which the boys use as a "hobby". The boys paint rooms, do electric wiring, construct work benches, thus contribute to the physical plant. The school has a very large central quad. It is located in a

W1 Jan. 23

busy part of the city, hence the large playground is much appreciated.

Visited Dr. M.A.H. Qadri, chairman, Dept. of Zool., Univ. of Karachi, 12 mi. N of town. Also met Dr. M. Tufail, a marine ecologist, Dr. M. H. Qazi, a vertebrate zoologist and physiologist who did work at Louisiana State and who knows Fred Cagle, Dr. M. Ahman an Entomologist, and Dr. Hamid Mahorad a systematic entomologist who studied at North Carolina State. Qazi, a tall, dark, handsome young man has asked for herpetological reprints. Dr. Qadri, perhaps in his middle 50's, graying, slender, crooked, spaced teeth, mustache, slow, sniffing speech, showed me about the museum. Many stuffed animals - rhino head to cassowary, preserved snakes & lizards of Pakistan, game birds of Pakistan, marine life, plaster models, etc., in hall 250' x 100', well lighted - many windows.

Qadri has gotten a wild patch of the campus set aside. His main interest is in desert ecology. He identified the large acacia as Acacia arabica and the cactus-like plant (not-tad cactus-like) as Euphorbia corollata. It has a milky sap. They also have several species of mosquito.

All men seemed interested in the "guidelines" approach and hoped I would send a copy for review.

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Asian TripKarachi

Jan. 23 On returning to Karachi saw a hoopoe; also ~~and~~ sheep & goats chewing on desert vegetation.

Qadri explained that Pakistan was rich in variety of flora and fauna. It is situated at the juncture of the Ethiopian and Oriental Faunal Regions and also gains elements from the Palearctic. He pointed to a north-south ridge to the west and said it marked the line between the two major faunas.

The desert results from the fact that the area, of low relief and somewhat out of the main flow of moist air, is ^{largely} missed by the Monsoons. During the Monsoon season, clouds may pass over but little rain falls. The mountainous areas to the NE (the Himalayan system) and along the west coast of India get the rain. The area of heaviest rainfall in the world is said to be in Assam.

Qadri remarked that the Nat'l. Commission on Education had introduced general sciences as a requirement in the secondary schools, yet there are no suitable books. He said that at the Univ. all students are likewise required to have general science.

In the evening, I had dinner at Jim Porterfield's. Present were Dr. M. Tufail, the marine ecologist, Mr. Wali Zaki, Mr. Broadhurst, a Britisher and UNESCO man.

Jan. 23 Tufail proved to be a soft-spoken, uneasy man who was dominated in conversation by the talkative, outspoken Zaki. Tufail, however, held his ground on important issues.

Zaki made it clear he felt our approach to introducing "guidelines" was unrealistic because there had been no chance for people to study the report in advance. He also feared I would return with recommendations based on inadequate ~~simple~~ information. He lamented the fact I had not seen country schools, but rather, had been shown the showpieces.

He remarked that my trip was typical of American surveys. He said, "They send out experts that make a quick survey and write reports and do not do intensive work to ~~be~~ help in teachers and equipment" (This ~~is~~ is a liberal quote from memory).

Equipment obviously looms large in his mind, although at one time he did say good teachers come first. I spent most of my time describing what I have been trying to do in the field with virtually no equipment, hoping to get across the point that children can learn the scientific approach without gadgetry.

Broadhurst said it was a "must" (before I write my report) to ^{that I} see a UNESCO report on Technical ~~Equip~~ Equipment and Curriculum for Science Studies (6 volumes).

I failed to mention that I visited the Karachi American School, Mr. R. Marlow, principal and made recommendations on laboratory equipment & projects. They are expanding and hope to improve their facilities for biological science.

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Karachi

Jan. 23 Capt. C. Bradford Collins is on the school board. Mr. Hall has a youngster in the school, hence both men were interested in having a biologist look in on the situation.

Jan. 24 Capt. Collins drove me about town for movie shots - I got vultures & crows in flight, a young girl scavenging for food in the garbage dump, donkey carts, mudoven dwellings, more "patley-cake," camels, etc.

We had lunch at his beautiful home after which we went to the market place (Empress Market) - fish, meat, fruit, dates, etc.

We visited a Parsi grave yard (religious group). These people "bury" their dead above ground, ~~and allow~~ the vultures and various lizards pick the remains. In the "modern" grave yard were large circular tanks of mortar & stone (?), white washed, & open at the top. Vultures and ~~quail~~ crows sat around the rim of the tanks. These people believe that fire is the only thing that is pure and they try to keep a fire burning in their dwellings. Most of these people live in the Bombay area.

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Jan. 24

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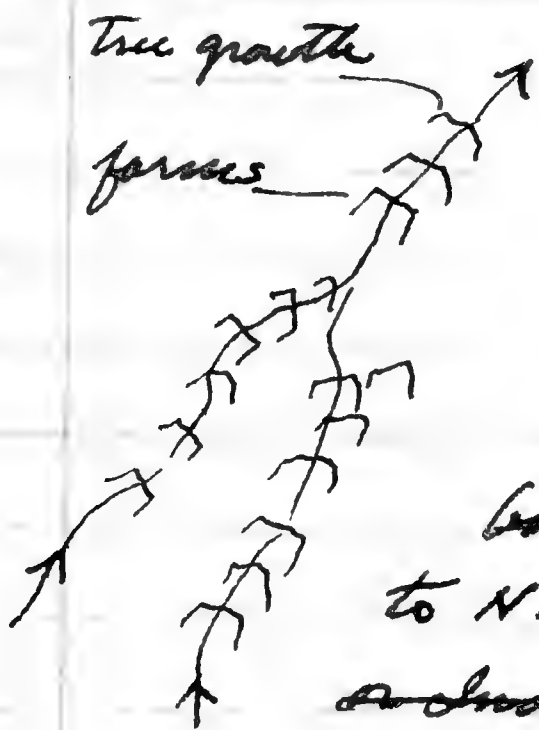
Karachi - Delhi

Jan. 24

Left Karachi International Airport at 3:45 p.m. Flight time to Delhi to be 2 hrs + 25 min, flying at 17000 ft. Plane warm, removed suit coat. 4:00 p.m. Flying over much dissected tan-colored desert land of low relief.

General drainage direction to SW. A few green water courses as we left airport - Indus River (delta region). Even in this arid country are patches of cultivated land (darker brown) and a few green fields. An occasional winding river course is seen with water but most are dry (4:05 p.m.).

Pattern of cultivated fields following dry drainage channels; marked off by tree (or bush) growth on down slope side. Gently sloping land to SE below ~~barren or~~ dissected ridge to NW. ~~We are crossing the Thar or Indian Desert.~~



4:15 pm. Crossing river Indus at 1700 ft, 350 mi. per hr. Will reach Delhi 6:15 pm. (5:45 pm standard time). Now great patchwork of farms; 50% green, rest shades of brown (crazy quilt arrangement). Large canal & many smaller ones make possible this irrigated sector. Blue haze. "Blow out" (sandy)

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have variously eroded some of fields.
4:25pm. Edge of arid land; abandoned farms.
Blue haze appears to be smoke. Several
smoke columns now evident. Numerous SSW
ridges in arid country but many large pools
near river. Water with high salt content?
No farms here but present along river nearby.
Pools confined to vicinity of river. Perhaps pools
caused by damming but no well defined earth works
seen. We must now be over the Thar or Indian Desert.

4:35pm. Now great patches of dunes (large colored)
appearing. Dune crests E-W, wind to SSW &
longitudinal ridges, brown, dotted with
rounded plants. Trend SSW-NNE. Even in this
arid region are
occasional clearings.



4:45pm. Dry looking fields
beginning to appear.
Dry-looking growth at
edge of fields. Trend E-W
at rt L to general trend

of drainage. Very dry-looking country. Village
seen with trails radiating a huts evidently in groups
surrounded by walls. ~~Herdsman?~~ SSW-NNE
ridging now less definite. Mountains beginning
to rise out of the plain. Reminds me of Argentinian
landscape S of the central plateau. Scattered patches
of fields continue (4:50pm). Some green fields seen
now. I suspect this is a goat
or sheep culture. Land very
dry-looking.



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Asian Trip

Karachi - Delhi

Jan. 24 5:10 p.m. Passed just S of city of Jodhpur, set down in arid country. Mountains did not last long; "flat" lands continue. Cooler now; have put on my suit coat. 5:35 p.m. Sun has gone down; visibility on ground poor. Beige colored flat land, arid-looking, a patchwork of fields, only 1-2 % are green & scattered. Cloudless sky but smog-like ground haze. 5:50 p.m. Passing over area with scattered low mountains. Region still looks arid but visibility very poor.

Arrived at the Delhi airport at 6:30 p.m. Air temp. 70°F.

Stayed at Nirula Hotel - very comfortable. Had dinner in Hungarian restaurant connected with hotel.

Jan. 25 Left Palam Airport on Indian Airlines flight #401 at 6:45 a.m. Chilly. At 7:55 a.m. we passed Lucknow flying at 17500 ft, air temp. outside -15°F, ground haze. I have no window seat hence can seldom see the ground. The plane is fully loaded.

Arrived Dum Dum Airport in Calcutta at 9:45 a.m. One hour bus ride into town. Calcutta is a sprawling city of some 6,000,000. My travelling companion, an Englishman (oil engineer) who is stationed here says 30 people die of small-pox a day and that they have had cholera epidemics.

Jan. 25

Each time I looked down during flight, there was a smoky blue haze. Found similar condition at Calcutta. After booking in at the Oberoi Grand Hotel (at about \$15.00/day including meals), I went to the roof for some photography. Photographed sacred cattle wandering about streets in heavy traffic, rickshaw boys, native carpenters at work, over view of city. This is a smoggy place. One can see many smoke stacks belching smoke.

The ride into town was depressing, noise, smog, littered streets, garbage, paper, feces, miserable human beings living in miserable shacks. Every body of water looked filthy and disease-ridden. The crow is still with us but the pale gray mantle of the Delhi animal is now almost as black as the rest of the plumage. ~~animal~~. Saw also the kite, myna, and many English sparrows. Incidentally English sparrows were seen warming their "tails" over the fluorescent lights in the airport building at Delhi, before sunrise. 8-10 birds were flitting ~~about~~ in and out of the building.

A few sights on the way to town - waterbuffalo standing in large pool, being scrubbed by a man. Group of nearly naked men bathing at one of water faucets along street. Naked children. Men squatting facing buildings, urinating. Sacred cattle wandering about, lying in the streets, on sidewalks, etc., generally having the run of the place. Most are ash gray and have a hump. All I've seen so far are females. Cow dung patty cake industry, the cakes not only spread on the ground but stuck to ~~the~~ walls and tree trunks.

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Asian Trip

Calcutta

Jan. 25

People lying on the sidewalk, against building, on steps, etc. Small shacks made of tin, wood and other scraps, erected on the sidewalk. A thin man sitting on a bed frame with rope "springs" (no mattress) on sidewalk in congested part of town, rubbing himself with some sort of lotion. Rickshaw men, bicycle riders, taxis, buses - horns blowing and exhausts belching smoke. People swarming everywhere. Sidewalk barber shops - haircutting & shaving. Sidewalk washing, the pavement used as a scrub board. Occasional well dressed, snubbed people, standing out by contrast with the rags and dirty skin of the populace. Hearse-like cart pulled by horse carrying 4 little rich girls, shielded from the squalor around them. These horse carriages carry a reserve "fuel supply" in the form of a bundle of hay, ~~for the horse~~. Many rickshaws, foot & bicycle powered.

From 3:30 to 4:45 pm. walked about town near hotel. There is a large open area to the west ^{where} ~~west~~ there are several sports clubs and a large grassy commons perhaps $\frac{1}{4}$ mi. across. The Independence Day celebration is to be held here tomorrow. Many bedraggled human beings lay about on the "lawn" - actually worn out grass with much litter & scattered patches of bare soil. Around one of the clearings

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was a shallow cement moat with stagnant water. This is evidently an open air sewer. I saw several ~~p~~ men urinating into it and about every 15-20 ft. was a human fecal mass. Cattle pies are liberally sprinkled about and the sacred cows walk down the sidewalks as ~~so~~ ^{though} they owned the place which in a sense, they do. I had to watch my step to avoid stepping in feces or masses of expectorated beetle nut. Many of the poorer Indians chew this. ~~and~~ It is a narcotic and probably helps to ease the burden of life. A beetle nut chewer is easily identified by his orange red lips and teeth.

It's not hard to see why the crow is so successful. I saw ~~one~~ one picking out edible material from a fresh deposit of human feces. Evidently about the only free-living vertebrates in town, other than the seemingly unattached cattle and flocks of pigeons are the kites, crows, vultures, and English Sparrows. There are fair numbers of dogs, goats, cats. I looked over nearly every tree I passed for insects, lizards, etc. but there were no signs of life. The leaves and branches were covered with soot and dust and ~~the~~ white wash streaks from numerous ~~of~~ crows. Their incessant cawing gets monotonous.

I have never before seen such a filthy, disease-ridden place. Great piles of garbage and other debris lie along the sewer ~~for~~ channels. Evidently they scrape out the channels from time to time.

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Asian Trip

Calcutta

Jan. 25 Incidentally, the crows were seen drinking and bathing in the sewage channels and picking at all kinds of litter. There is a train depot here where one may see 8-10 trains at once and as many buses - all in the open air. I saw a thin ragged Indian operating a switch by using a crowbar to shift the key rail. Some girls were found sleeping on the sidewalk. I had to detour to avoid them. A line of wash hung on the iron fence nearby. Evidently this patch of sidewalk near the train depot is "home". One of the girls had a large goiter. A crowd at one point was watching a sidewalk artist who was sketching with ~~charcoal~~ ^{charcoal} and pastels directly on the cement. Another crowd was listening to a "John-the-Baptist" type preacher. A mounted policeman stood nearby. Another crowd had gathered around a man seated on the ground who was beating a drum.

Again, a place of contrasts. Inside the Grand Hotel, I live at the height of luxury, soft carpets and lights, music, the most elegant furnishings, people smartly dress. All is clean, cool, and ventilated. Outside within inches of the entrance are people in abject poverty, thin, nearly

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starving, diseased. Filth is everywhere - on the ground, in the air, on people's bodies and coating the vegetation. What a mixed up world we live in.

Jan. 26

Out on roof of Grand Hotel at 8:15 am. to photograph crowd scenes at Republic Day celebration. Parade only lasted about an hour. Ran out of film just as crowd began dispersing but got back in time to get what was probably peak movement. Formalities lasted from 9:00 am to 10:00 am.

Also got closeup shots of crowd, kite circling with people in background. Kite making a capture of an English sparrow (?). One also seen with vegetable matter in beak. Nesting material? Got shots of street scenes - shoe polish boys, banana vendor, butcher, banana vendor unloading, goats, etc.

Saw a funeral procession. About 25 boys carrying a middle-aged man, face exposed, on a litter. The corpse was draped in white and the litter was decorated with orange crepe paper. The boys walked rapidly crying out loudly from time to time. I learned from Miss Mason that they were taking the body to a place for cremation. The bones are supposed to go into the ganges. There are many ghats ^(crematoriums) along the river.

Had dinner with Miss Mason and Stanley Clarke, a British T.V. man who had just completed a film on "Hunger" for the United Nations. Film made free of charge. Considered an honor to be asked to prepare film.

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Ocean Trip

Calcutta

Jan. 26

The film centers on a man in a small village. He has had to borrow money for his daughter's wedding. He then has to borrow money to keep his farm. He is perpetually in debt. He goes to the city to find work & sleeps on the street. The British company found ~~an~~ a ~~excellent~~ local farmer who proved to be an excellent actor. He was put up in the Grand Hotel. The local help accepted him, although below them in rank, because they were told he was an actor.

One difficulty in getting across birth control is the desire for boys. A family keeps growing until there are adequate numbers of boys; girls cost money when married off. Many children is a prestige factor and men are not inclined to have vasectomies because they think it will impair their ~~power~~ pleasure. What else is there to do in India after dark?

Miss Maxon (14 mo. in India) feels that education is more important than a birth control program. Latter cannot work without former although she cautions that a pill with an aphrodisiac attached might work.

If one hurts a cow he is in

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Trouble. In a recent traffic accident, Miss Mason said a cow was seriously injured by a ~~jeep~~ jeep. The driver and car occupants were set upon by angry people. More notice is taken of the death of a cow than of a person.

Recently they passed an anti-bull law which has taken all the bulls off the streets. The cows remain, however.

Jan. 27 - Hired a taxi for half day to take movies. Got shots of man washing clothes on sidewalk, cow pie's plastered on tree trunks, etc, people bathing, little girl gathering water hyacinth (?), sacred cows, man sleeping on sidewalk, street scene, white egrets & cattle, water buffalo by pool on road to airport, woman carry basket of fresh dung on her head.

Saw a skink-like lizard streak through the grass at side of drainage ditch at roadside near turn off to airport. This is a rural area with numerous water tanks (earthen reservoirs (?) or ponds), ~~thatch-roof~~ huts of woven plant fibers, banana trees.

To return to problems of Asian education. One of my contacts ~~in~~ has suggested that the recipe approach to science may be needed because of the rudimentary educational levels with which we are dealing.

~~Miss Mason's address is 241 G. 2 Tower Circular Rd.~~

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Asian Trip

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Calcutta to Bangkok

Jan. 27 Left Dum dum airport at 1:20 p.m. on Thai International, Flight #302. ^{Met Dr. Dart at airport.} Clear and warm but somewhat smoggy. Flight over Ganges Delta, at 15,500 ft. Many meandering channels and pattern of farms indicating ^{old} channels in a constantly changing ~~map~~ mosaic. A moving picture frame each year would present a constant play of movement of the braided stream system and farm lands. Bumpy over these areas of wet and dry lands. As we left Ganges Delta, passed over large forested area with patches of sand and narrow white beaches. Marine turtles must breed here. A naturalists' paradise. Pass across northern part of Bay of Bengal. In distance above sharp ceiling of smog can be seen white clouds, perhaps our Himalayas. Dr. Dart says these mountains are drained along their north and south slopes by a single river ~~stream~~ on each side. The northern one swings south around the east end and continues to near the Delta where it joins the Ganges. Traveled SSE along the west coast of Burma. N-S oriented ridges covered with abundant plant growth, virtually unpopulated. Farms confined to low-lying, level areas. 3:30 p.m. (actually 4:30) Bangkok time we are beginning our descent over the

Rangoon Delta. It is getting busy.

At Rangoon Airport, stopped for $\frac{1}{2}$ hr.
 Beautiful garden - Boguilla, orchids, etc.
 Crows, all black, with high pitched call.
 Airline ~~hostess~~ hostess said Burma was a
 rich, undeveloped country - tin, teak wood,
 antimony, coal. Elephants used in handling
 teak. Wild elephants & tigers in north. Kites
 & vultures come onto airstrip. Rice export is big
 industry. We crossed miles of rice fields,
 all brown. It is harvest time. Stacks
 of rice straw and rice seen. Some stacks
 had burned areas around them, I suppose to
 protect against fire. Saw one field in flower.
 Numerous pagodas. Meandering streams.
 Teak wood logs along banks of rivers.

5:50 pm. (local time) crossing Gulf of
 Martaban. So got dark, hence no further
 observation.

Stayed in Rama Hotel but checked out
 next day. Too rich for me. The unit of
 exchange here is ~~the baht~~ a "baht" or "tial"
 equal to about 5¢. 20.25 baht = \$1.00.
 100 baht = \$5.00.

Jan. 28

Visited Dr. Pradieth Cheorakul
 (pronounced "Pradit Cheorakun", but it is
 the first name that counts here). He is
 Deputy Secretary-General, National Research
 Council, Bangkok. He has a B.Sc. (Chulalongkorn
 Univ., Bangkok), M.S. (Philippines) and Ph.D.
 (Cornell). At Cornell he got his degree in 1944 in
 organic chemistry with a minor in biochemistry.
 He is a slender man, perhaps in his 40s, He reminds
 me a little of Bob Karpus.

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Asian Trip

Bangkok

Jan. 28 He called to our attention the following report which he thought would be of some interest in our survey:

Nicholls, Frank G., June, 1960,
Report No. TAO/THA/, A program for the development of scientific research in Thailand. Prepared for the Government of Thailand by F. G. Nicholls. Appointed under the United Nations Program of Technical Assistance. I believe Nicholls is an Australian. It seems, however, to have little to do with secondary school education. Pradieth mentioned that U.N. funds had been received to set up a ~~corpo~~ corporation based on the Report.

Pradieth is very much aware of BSCS and PSSC work and translations are being prepared and subject matter adapted to the country. CHEM study materials are also being considered but he was unaware of the Chemical Bond study.

Proberman of BSCS came through about 4 months ago and translation of BSCS material is underway. The plan is to adapt all of the material to Thailand and to do so in installments published in the "Science Magazine". At each printing enough extra pages are being run off to make up text books ~~into~~ which will

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sell at low cost. The project is helped by the fact that ~~Panee~~ Panee Chiovanich, a woman who did work at Wisconsin and also participated in the biologists' writing conference at Boulder, is involved in the translation and adaptation to Thailand. In the ^{Yellow} ~~Green~~ "Version", for example ecological principles will be illustrated with Thailand flora and fauna. The project is helped by the fact that there is only one native language. There is, however, not the common bond of English found in India.

Pradisth said they had planned to compare the effect of the new curriculum materials in biology with the old ones but they can find no teachers who are willing to use their classes as controls.

A similar project involves the PSSC materials. Sippanondha Ketudat, a Harvard physicist is doing the translation.

The interest of the Science Society of Thailand, of which Pradisth is Secretary General plus the fact that Panee returned enthusiastic from the Boulder conference has led to trial of material in the schools. The Ministry of Education is going along and will make the final decisions on curricular changes.

The Science Society is a private organization of considerable vigor, made up of scientists from many fields and includes science students.

Some of the things that are being done to encourage secondary school science are as follows: 3-4 5yr. scholarships

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Bangkok

Jan. 28 are being awarded each year (programs on some ABs have been extended a year - hence 5 yr. duration). Awards are based on the performance on the "Combined University Entrance Examination". Students list their choice of colleges (lines of specialty) in order of preference. Colleges include - agriculture, education, dentistry, science, political science, medicine, pharmacy. Previously each university gave its own examination. The College of Education attracts the weaker students.

School children come to Bangkok for the examination. ~~a~~ A district officer, however, may administer the high school matriculation exam., although it is designed by the university.

10,000 may apply for the "Combined Exam.", but 7,000 may end up taking it. Last year, I believe, 4000 were accepted by the various colleges.

I asked about science requirements for high school students. Pradith said all students must have general science which includes chem., physics, and biology. Science students of course take additional work. There are separate courses in physics, chemistry, and biology.

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Thammasart University in Bangkok, with faculties in social welfare, public administration, political science, accounting, economics and law requires 2 years of general science of all students. The other universities, however, do not have such a requirement as yet.

The scholarships mentioned earlier are supported by the Asia Foundation and Rotary Club. A high school graduate is about 18 yrs old & has had 12 yrs. of schooling. He may take 5 yrs to get his A.B., depending on the course.

Science Fairs in the secondary schools are also a stimulus to science training, as are Science Clubs.

The Asia Foundation helped send a teacher and 2 students to the Japanese Science Fair. There is a move afoot to establish an Asian Science Fair with the Philippines, Taiwan, Korea, Thailand participants and the countries would take turns being host. A teacher and 2 winners were sent to the International Science Fair in the U.S. but the cost was so great this procedure cannot continue.

A science refresher course for science teachers has been instituted but it is very short - only 10 days for physics, chemistry, and biology. Only the most outstanding advances can be considered. It was held at the Univ. & some 400 teachers attended. The program was supported by the Science Society and the Ministry of Education. Because of the short time available for the

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Bangkok

Jan. 28 course, thought is being given to offering only one science field each summer.

The Science Society publishes the Science Journal, arranges Science Fairs, teacher institutes, etc. Leaders of the Society are also connected with the Research Council and have influential contacts with the Ministry of Education and other government offices. The society is supported to some extent by the government 100,000 bahts a year (5000). At the present time the president of the Executive Committee of the Nat'l Research Council is also chairman of the Science Society.

Dr. Dart and I also visited Mr. Graham J. Lucas of the Asia Foundation (P.O. Box 1910, Ph. 3-1962). Lucas said Pradieth is an able man but has difficulty in delegating responsibility. He remarked ~~that~~ that the Nat'l. Research Council was mostly a paper organ but that one of its divisions, the National Documents Center was a start toward something solid. Lucas is a tall, business-like man, balding, in his late 40s or early 50s? He suggested it would be good for us to see A. L. Gardner, a UNESCO documentation man, who touches on science matters.

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Ph. 48028. He said that the educational program of Thailand was rather inflexible and that exams were fixed. He thought that interest in science was greater in Pakistan than here. Popular "science" fields in Thailand are medicine, biology, and math.

He urged us to see Dr. Kamhaeng Balangura, Secretary General of the National Education Council. He is a biologist and a senior scientist who can comment on curriculum change in the country.

Thais will work with their hands in contrast to certain other "upper class" Asians.

Bangkok can give a misleading impression as to the progress of the country; outlying districts are not nearly so well developed. The country as a whole is well off economically. There is export of food surpluses. The central plain is in good shape but the NE sector, which drains to E into the Mekong River & (which forms the border of Laos) is primitive. The people do have ties with those in the central plain but some Communist subversion is going on in the extreme NE. Although Bangkok is well developed there is no widespread development of manufacture of science equipment. The old story emerged of the best people being siphoned off from teaching into more lucrative positions. Money has been going into dams and other development projects. The Education Ministry hasn't done so well.

There is a high level of literacy.

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Asian Trip

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Bangkok

Jan. 28 Grades 1-4 are compulsory. Actually the Ministry of Education has done quite well. The World Bank is considering giving them a loan but Lucas did not know how much was earmarked for science.

The Asia Foundation is helping mostly at the university level and has been aiding the Science Society. This society, the Nat'l Research Council and the Ministry of Education are the key organs that would be involved in science curriculum reform.

All Thai universities are in Bangkok except one.

Bangkok has about 2 million people. The northern part of the country is little populated. It is somewhat mountainous and there is rather heavy jungle.

Roads, until recently had been kept rather poorly developed ⁱⁿ Bangkok on the theory they would interfere with the railroads. The view has changed and improvements are underway. Transport is adequate to easily get secondary school children students to the University.

Lucas mentioned that Chobory, a pretty hilly country to SE would be a good place for a visit.

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Chiang Mai in the mountains N was also mentioned. It is 18 hrs. by rail, 3 hrs. by air, about 400 miles N of Bangkok. Round trip by air is about \$30.00.

Jan. 29

Out on the River at 7:30 a.m., for conducted boat trip to "Floating Market," Temple of the Dawn, and the "Royal Barges" dock. Returned at 12:00. Many fascinating sights. A few scattered impressions and observations - Wild animal life: little seen - a few butterflies, many gulls on the main river, attracted to refuse - all apparently of one species, the kite (same as in India & Pakistan?), English sparrows, the "myna" (as in India), the mud-skipper (Periophthalmus), Domestic animals - many dogs, fewer cats, parrots, Foods seen on sale - pineapple, several kinds of bananas, coconuts, celery, onions (?) rice, greens of several sorts, corn, papayas, melons, fish of several kinds, meat. Vegetation along the side channels - bananas, coconuts, papayas, & other trees. Transport - boats of many sorts from little "half-moon" boats propelled by oar by one person to steam ships. Many rice boats with family quarters at one end. The appearance of these ships will be recorded in photographs.

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Asian Trip

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Bangkok

Jan. 29

Harvest season for rice. Many boats loaded. Rafts of bamboo, ~~many~~ used in house construction. Houses of wood with corrugated iron roofs, for most part, on stilts (which are attacked by Teredos & termites). Many people bathing, washing clothes, eating breakfast, cooking. Drinking water supply in pipes, according to our guide, & stored in large urns. River water contains sewage & refuse of all sorts. Cute children waved at us as we passed. People in general look in good condition, well fed and happy. All seem to accept being photographed as a matter of course. Our boat followed the tourist loop along a side channel from the main River. Boys seen urinating into the water. Great throng at Floating Market - on shore and in the water, which was cluttered with boats - a constant traffic jam but everybody seemed good natured. Boats loaded with charcoal seen, propelled by person standing a working oar attached to top of post by twisted cloth. Out in main river were many sleek fast ~~canoe~~ ^{propeller-driven} canoe-like boats with long shafts.

Dawn Temple & imposing gaudy structure with vast pieces of pottery and ceramic pieces. Huge gold Buddha

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and his "staff" (several smaller figures) in room in front of main structure. Buddhist monks with shaven head and orange robes were seen here and elsewhere on our trip. Dr. Dart says they may serve only a few years and then return to secular life. Young men in their teens or early 20s were often seen.

Teakwood seems to be the main wood construction material.

In the Afternoon visited the Chulalongkorn University. Dr. Dart met with a plucked science group, I with biologists. I met the following persons: Dr. Kloom Vajoropala, a solid man, who teaches elementary zoology and entomology; Shanawat Devakula, a microbiologist; Mrs. Punnee Buddhari, Supervisory Unit, Dept. of Sci. Educ., Sunthorn Sirisavahokhera^{sp.} Entomology, Dept. of Biol.; Panee (accent on the last syllable) Chirawanich, Embryology, Dept. of Biol. and two others whose names I did not get. Miss Panee and a Miss Rojanee Charuprakorn, Prep. School, whom I did not meet, have worked on BSCS in the U.S. and the latter is now trying out some of the material. Sunthorn has also tried some of the material.

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Jan. 29 and says the students like it. It is not dull like their usual work.

The group listened attentively to my expose of "guidelines"; then Miss Pance said the main problem would be for the teachers to find time to study the manual and to think about design of experiments. Secondary school teachers teach many subjects and work so hard there is no time or energy left for creative thinking. Mrs. Pance, the Sci. Ed. Supervisor, said prescience students got 8 hours of theoretical and 2 hrs. of practical science a week, including all phases of science. There are about 4 hrs. a week allotted for science in the non-science curriculum and lab. time depends on the teacher, who may prefer to make the course all theoretical. ~~One teacher~~ ~~announced~~ ~~handles~~ Miss Pance pointed out that a big problem was lack of suitable reference materials or need for translation into Thai, since few secondary school teachers know English. There is also the problem of the examination that is prescribed at the end of the secondary school training & must be passed

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for the highschool diploma. Then there is the University Entrance Exam. Few teachers will spend time on new materials since the students must be schooled on the examination questions. Dr. Kloom has written a biology textbook which is close enough to the "yellow version" of BSCS that the "yellow version" lab manual is being translated in toto and tried out as the practical part of the course.

Kloom emphasized equipment shortages but Mrs. Punnee said that 90% of the high schools had at least 1 compound microscope in the science lab. One of the other group members then said, "Are the students allowed ~~to~~ to use it?" which caused considerable laughter. Teacher student ratio in labs is around 1-30.

All seemed to feel that Ministry must be convinced before a change will occur and all felt that the new approaches (BSCS + PSSC) were needed. No enrolling necessary here.

Jan. 30 Spent morning writing letters, including one to Mr. Judge, the Asia Foundation Rep. in Manila, to let him know I was coming. Dr. Dart and I plan to separate again following our trip to Hong Kong, he to go to Taipei and

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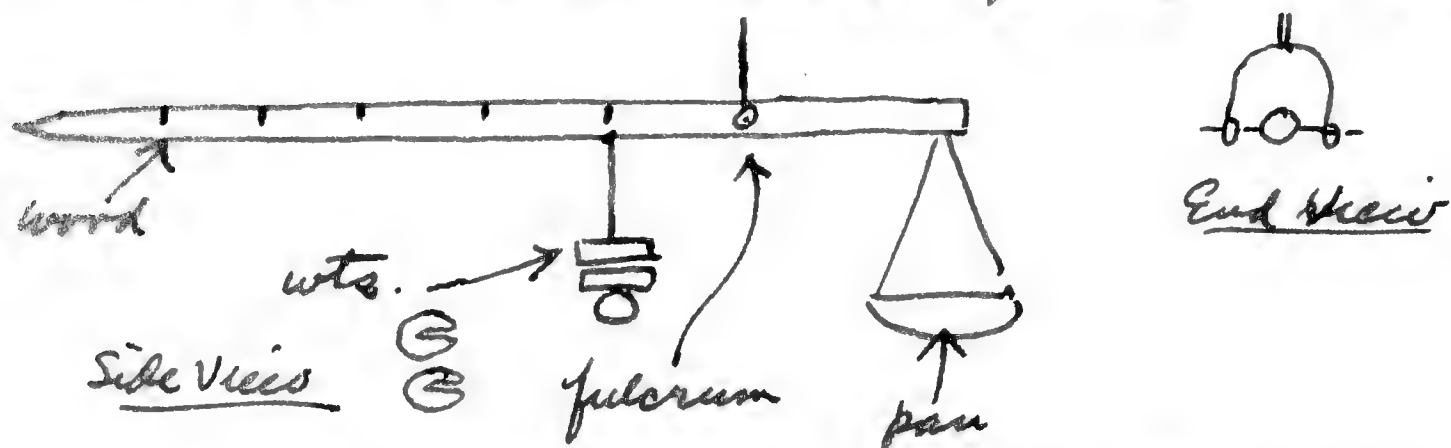
Jan. 30 Tokyo, & to Manila. In the afternoon we visited Dr. Kamhaeng Balantura, Secretary General of the National Education Council. We met him at Chulalongkorn University. He has had training in anatomy in the U.S. (Harvard I believe). He is a short, pleasant man in his late 40s (?), with a hearty laugh and friendly manner. Dr. Kasin Suwatabandhu was present throughout the interview. He was ^{also} present yesterday but had to leave early. Kasin is a systematic botanist in the Dept. of Botany at the University. He is a very thin, slight man but alert and obviously intelligent.

He reflected on my suggestion that a good teacher could lead the children in research out doors on wild plants and animals, even if she knew little biology if she had some knowledge of the scientific method and was willing to accept the point of view that ~~she~~ she and her pupils were searching and experimenting together. I had used ^{my} ~~by~~ experiment with spiders as an example. Kasin remarked that in most cases, the children, coming from the country would ^{know} a lot more natural history than their teachers. Some children hunt for insects, etc. for food.

Since I was suffering from laryngitis, Dr. Dart presented our story concerning

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Jan. 30 "guidelines". When he emphasized that the new curricula in the U.S. were using simple materials and described a scale made with needle and straw and calibrated by the student, Dr. Kambhaeng remarked that Bangkok children would readily be able to do this kind of thing. The people use a home made scale in the market places. See drawing.



When asked how he hoped to get new curriculum materials adopted in Bangkok schools, which would be dependent on the support of the Ministry of Education, he said they are trying to set up a controlled experiment to see if the new course in BSCS will give better results on the Univ. Entrance Exam. than the old approach. Dr. Kambhaeng acknowledged that there would not only need to be questions of a factual nature but also questions to test understanding and ability to use the scientific method to fairly test the new materials. He said exam questions were going to be written accordingly. He said the Ministry is willing to try the new materials as long as they cover topics designated on the test.

Kambhaeng reiterated the point that summer courses in science had been set up in chemistry, physics, and biology.

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Jan. 30 and that these courses could be used to introduce the new methods. He agreed that to teach all three to all participants was too much to cover in a short time and that it would be better to cover one subject for a given group of teachers.

In the course in general biology the students study both plants and animals — compare plant and animal cells, study classification. In physics, however, there are separate ~~but~~ elementary courses on heat, light, etc. Both Kasin and Kanchany stressed the need for considering structure and function together in the study of living things.

There is presently compulsory education through the 4th grade in Thailand. The level is restricted by economic factors. The hope is to gradually increase to the 7th grade, district by district.

The Education Council decides policy but the Ministry must work out application of policy, thus in effect, the Ministry must be persuaded of the value of a new program before it can be put into action.

Science Society also makes recommendations

As to the training of graduate students — they can choose their field but the

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Ministry controls numbers of students in various programs by shifting support.

The Nat'l. Research Council and the Nat'l. Education Council have an informal connection since they communicate through having personnel in common. Thus if it is decided more biologists are needed, the Nat'l Research Council could influence the Nat'l Ed. Council which would then apply pressure on the Ministry.

Money comes to University Departments from the Nat'l. Research Council but distribution of funds by a Department over the basic vs. applied research areas, is up to the department. However, at present stress is on applied research because, according to Karahaeng Thailand wants technological progress in a hurry. When Dr. Dart remarked, "Why are you in a hurry? You have plenty of food, etc." Kasin said, "Yes", but in 30 yrs. our population will have expanded to the point where we will no longer have rice for export. Dart suggested that in long run may make greater advances and be less dependent on other countries if more

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Jan. 30 emphasis on basic work. Both men agreed. They said, "Why don't you ask Pradith why we are emphasizing applied research?" Both are basic research men themselves.

At present time the country is employing many engineers. There is not yet public demand for scientists. The hope is there will be in 5 yrs. and that by then the people will see the need for basic science and that applied science depends on the former. Dart emphasized, however, that it would be well to look ahead now and used an example from India. Germany has an arrangement with the chemical industry of India whereby the Indians can manufacture certain chemical substances developed by the Germans, but the latter never release their latest discoveries for licensing in India. Since India is not producing basic research scientists in chemistry in any significant numbers, she is unable to come up with new chemical products herself and is thus always producing the outmoded or second rate materials of another country and is not in a favorable position to compete in the world market. If she is not to be always a step behind (a follower), she will need to begin to stress basic research in chemistry.

India has tried to solve her chemical

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problem by erecting a tax wall to outside products and thus encourages her people to buy inferior products. The export market is poor because she can't compete.

I asked Dr. Kasin about the status of taxonomic biology in the country.

He estimates that over $\frac{1}{3}$ of the higher plants remained to be described. He thinks there must be 15,000 species of which only 8000 have been described. He has travelled widely over the country on botanical research. He thinks only $\frac{1}{5}$ of the insects and $\frac{4}{5}$ of the vertebrates have been described. Fresh water algae are virtually unknown. Marine algae are being studied first. George Papenfuss has visited in the country and been a stimulus to this work. Zoologists and botanists in the country exist in "parts per million".

For 22 yrs. Amphioxus has been known from off the delta in the Gulf of Siam. Not until 1959-60 were 3 new species described. Natural history now being started.

We learned that a 3 hr. drive to NE would take us to an upland wild area that still has a few elephants but they are difficult to see. The place is Kaengai. To the SE are a number of sea shore sites of interest - Choburi (90 kms.), ~~Sa~~ Sriraja (120 kms.), Patya (145 kms.), Sattahit (180 kms.). I learned the main river near Bangkok is formed by the Chaophraya and Tachin rivers.

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Jan. 31

Today was to be school visitation day. Dart and I met Mrs. Punnee and a Mrs. Praphanee Kasherisiri (pronounced Pra-pa-ni Ka-sem-si), both supervisors in secondary school science, who were to conduct our tour to 3 schools. Mrs. Praphanee has taught chemistry and physics but has had very little biology. Mrs. Punnee is also oriented toward physical science. However, we looked at biology labs. Both have spent time in the U.S. - Punnee at U.C. Berkeley and Praphanee at Indiana (I believe). They are highly intelligent girls.

They explained that in the 11th & 12th grades, the students choose 4 out of 5 fields of science - chemistry, mechanics, heat and light, magnetism and electricity, and biology. They spend 2 hrs. a week on each subject - a total of 8 hrs. of theoretical (lecture + demonstration) work. Now 2 hours a week practical work has become compulsory. The student can take one hour in each of two subjects or can take, for example 2 hours of biology one week and 2 hours of physics the next week.

We went first to a coeducational

Jan. 31 school, the Triam Udom School, where Pamee Chirawanich, who worked with BSCS, is having Miss Rojane Charuprakorn try out the curriculum materials. Miss Rojane was in the midst of a review since the students are to be examined next week. She spoke in Thai and had the students come forward and, one by one, add to drawings of floral parts and a cross section of a root and stem, and to label the parts. The review lesson seemed to be all morphological. She then showed me pressed plants neatly prepared and sewed in place on white blotting (?) paper and covered with cellophane. She said the students were just getting started with this work and ~~are~~ were enthusiastic. She also showed my trays of fascinating insects also prepared recently. In another room ~~students~~ she showed me samples of grafting and showed how the joints are tied closed with thread and covered with a plastic wrapping (like saran-wrap). She claims it is better than paraffin or wax. In another room students were being examined on their ability to cut and stain thin sections of plant tissues. They use a razor blade that folds into a metal case (like the old style razors used in shaving). I wonder why there are not more cut flowers but Miss Rojane said accidents were rare. There must have been 25 microscopes - a small Japanese type but with good resolution. The ~~labs~~ ^{rooms} were airy ^{with} high ceilings.

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Jan. 31 and good light. The walls were white. There were many movable tables with formica(?) tops. This is regarded as one of the best equipped schools in Bangkok. These children are well off. They have an enthusiastic teacher with the latest curriculum materials and are working in a well-equipped laboratory. I saw copies of the "yellow version", evidently including lab. manual, text, teacher's guide, etc.

Miss Rojance says the students are excited over their work, much more so than with the old approach, and she is confident they will do better on the tests than previous students. The class is using Dr. Klom's textbook.

We then went to the Stri-Vidhya (pronounced Stri-vit-ya) girls school, 8-12th grade. The enrollment is a little over 1000. Mrs. Somponi Phalakornkul was in charge. She has done work at Ohio State where she studied education and chemistry. ~~A~~ A lab had been arranged for my benefit. The girls were working on floral parts, making sections and drawings. This room ~~of~~ ^{had} less space but had a high ceiling, was airy and had plenty of table space. The work tables, however, were fixed. There were fewer microscopes. I was shown charts of fishes of Bangkok,

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Jan. 31 prepared in water color by students.

As in India, there seems to be much emphasis on art in the biology classes. This is OK if not overdue, in my opinion. It may encourage aesthetic appreciation of nature.

Large numbers of butterflies were feeding on flowers in the yard. I caught a few by hand. Soon there were a number of girls catching butterflies. Some were brought to me. Just as we were leaving Mrs. Somponi brought ~~me~~ a "lantern bug" I had admired in one of the student collections. The girl who had collected it wanted me to have it. Mrs. Somponi is a small, quiet, thin young lady, perhaps in her ~~late~~ early 30s. I suggested to the science supervisors that a butterfly marking study could be carried out in the school yard.

The students at both schools were in uniforms.

After lunch we visited one of the substandard schools across the river in Dhonburi (a suburb of Bangkok). It is called Ta-wi-ta-pi-sek. It is overcrowded and running in two shifts. There are some 1800 students (boys). The afternoon shift consists of ~~500~~ 500. One science lab. handles, chem., physics, & biology. The school contains grades 8-12 (mostly 8-10th grade students). They will be getting money for a new

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lab. next year, and a new building. Since practical work is now compulsory (has been for 1 yr.), there will be a number of new labs. constructed in the schools. A syllabus, prescribing 20 Topics as minimal in biology has been put out by the Ministry of Education. Mrs. Praphanee read me the list. I can remember a few topics - photosynthesis, O_2 production by plant, CO_2 consumption by plant, osmosis, evolution, etc. Evidently the Teachers are allowed considerable latitude in developing the topics. Mrs. Praphanee & Mrs. Punnee have written lab manual to implement the specifications of the Ministry (yet neither is a biologist). Other manuals are available, written by other people. The Teacher has a choice.

The young woman teacher, whose name I didn't get, said that she was going through the lesson on flowers for a second time for my benefit. The boys were drawing the parts of actual blossoms and referring to her board drawing for help in labelling. Razors are in use again. Many different flowers were in use and the teacher explained that it was up to the student to learn to recognize the parts in flowers.

Jan. 31 other than the one upon which he based his drawing. In the lab. (the boys were working at their desks in the lecture room) was various stored equipment - physical equipment, preserved specimens (including a human brain), a large wooden figure of a man with leglets that turn on in sequence to show circulation of the blood, ~~the~~ badly stuffed & mistreated mounted birds & mammals (not many). I described the technique of preparing and storing scientific study skins and urged that this be the kind of student material prepared.

The lecture room was again airy and well lighted (natural light) - many large open windows and high ~~ceiling~~ ceiling. The tables were movable. I sketched how to make a cheap terrarium when requested to make suggestions for the lab.

A standard microscope (\$60) was brought out and I was told it was defective. As far as I could tell it merely needed cleaning. There was a thumb print on one of the oculars.

I have been asked to send reference books to the school through Mrs. Praphanee.

We then went to ~~the~~ a large building near the Ministry of Education, where the science supervisors work. There are only 4 of the latter for the whole country and a total of some 15 supervisors of all subjects. There are some 400 govt. second. schools in Thailand.

While waiting for a taxi, we saw a huge lepidopteran insect in flight at

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Jan. 31 a height of over 50 ft. It must have had a wing span of 8." This is the country for outdoor biology.

An appointment was made for Dr. Dart to see Mr. Sarnan Sumitra, ^{the Department of} Director General of Secondary Education. The science supervisors urged that he be briefed on the new U.S. curriculum studies. He was formerly a physics teacher.

In the evening Dr. Dart and I attended a dinner party. The affair evidently stemmed from the departure of
and our visit. It was stag.

Present were Kloom, Kamhaeng (bracketing Stebbins) at the table),
(bracketing Dart), and
and Pradieth.

It was a very pleasant evening. I ate shark's fin soup (rather cartilaginous but tasty), duck brain and tongue and steamed abalone (imported) for the first time. I was told the abalone had an aphrodisiac effect.

In comparing the possibilities for development of laboratory science in the secondary schools here and in India, I have the feeling that Thailand is more willing to experiment and perhaps

is less hidebound. The economic health of the country is better, it seems, and there will probably be money for education — in increasing amounts. The leadership below the Ministry level, at any rate, is looking forward and seems progressive.

Harking back to Calcutta, I believe it was Miss Mason who told me that sometimes people sleep in the middle of ~~the~~ the road. When a horn blows, they get up but go back to sleep after the car passes. The pavement is warm, smooth, and clean.

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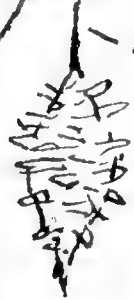
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Feb. 1

Arrived at Chulalongkorn Univ. at 8:30 a.m. Wandered along canal at front of biology building while waiting for Dr. Kloorn, who will take me to the Pastur Institute. Noted following:
kingfisher - pale blue, pink, and black markings.
myna - as in India. Saw at least 3 other bird species, unidentified. Saw damselflies, water striders, ants, water boatmen (or back swimmers?), butterflies, spiders that run over the surface of the water, snail shells, a bagworm-like cocoon. These were quite common and hanging from the bark of trees and branches of bushes. I open two - one contained some 25 eggs (?); the other a fully developed wasp with long ovipositor. Dr. Kloorn said the wasp parasitizes the lepidopteran larva that makes the cocoon. The cocoon is covered with bits of plant material and is light brown. Drawing is actual size.



I saw a well-camouflaged gecko, like those around the hotel on the rough bark of a tree.

Tinea

It had evidently been sunning and on my approach ~~it~~ dodged under a piece of bark. I found an ant carrying a newly transformed damselfly up the trunk of a tree within 8 ft. of the canal. Dr. Kloorn says the ant has a funny sting.

Feb. 1. I could see a dead branch high in the tree that had a number of holes in it. Perhaps the ants nest there.

There were water lilies and a floating pond weed in the canal - also fish.

There is much biological material close to schools here in Bangkok.

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Visited the Pasteur Institute under the guidance of Dr. Kloern. Took movies of king cobra, cobra and stills of them and the banded krait. Obtained a brochure on the Institute so will not repeat brochure information here. The official name of the Institute is Queen Savartha Memorial Institute. Met the assistant director Dr. ~~Saprapan~~^{Sripapai} Phong-Aksara who helped show us around. The snake handler was quite free in his handling of the cobras. Apparently they rarely bite. He picked up some 10-12 kraits in one handfull. These snakes are banded with dark brown and yellow. There are some 200 deaths per year caused by venomous snake bite. There have as yet been recorded no king cobra bites. The Institute prepares a specific anti-venom from 5 venomous snakes of Thailand - cobra (Naja naja), king cobra, Russell's viper (produced hissing sound), Malayan pit-viper (Aniathodon rhodostoma), and banded krait (Bites rare).

Dried venom keeps indefinitely. Venom extracted into watch glass - vacuum-dried or desiccated in chamber with calcium chloride, mixed with normal saline and injected into horses in

Feb. 1 increasingly larger amounts, ~~have~~ subcutaneously in neck region. Blood drawn from vein in horse's neck. Formed elements allowed to clot & settle out. Then serum filtered and dried. White powder results. Powdered serum will keep for 5 yrs., especially if refrigerated. The serum is mixed with normal saline^(?) for injection — perhaps it was distilled water. 60-100 cc. may be injected for a cobra bite, ~~relatively~~ more for children. The cobra is common in the central Valley and causes the most bites. It occurs even in Bangkok and one very large one was caught recently in back of one of the hotels. The cobra (*Naja naja*) has a venom 10 times more potent than king cobra venom but the latter injects a large quantity, hence is regarded as very dangerous.

Russell's Viper and the Malayan Pit viper have hemorrhagic venoms. The krait has a venom with both neurotoxic and hemotoxic effect. The cobras have neurotoxic venoms. In the case of Russell's Viper there is much bleeding from the mouth & digestive tract — embolic form, ^{at least in small animals.} There are also species of *Trimerisurus* which have a hemotoxic venom but these snakes are not as dangerous as the others. Three species of ~~sea~~ sea snakes occur along the Thailand coasts and fishermen are sometimes bitten. However, the venom glands are so small, the Institute has not found it possible to prepare anti-venin.

Many people come in for treatment that

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Feb. 1 have been bitten by harmless snakes. It is usually easy to distinguish between ~~envenom~~ poisoning from neurotoxic and hemotoxic venoms. It is difficult, however, to distinguish krait from cobra, if the victim did not see the snake. Treatment is for cobra, since krait bites are so rare. The krait is disinclined to bite and unless hurt in some way will usually not bite. King cobra bites are rare because it is a jungle snake.

The Institute treats rabies cases. There is considerable dog rabies in Thailand. It also maintains a blood bank.

I forgot to mention that ~~the~~ ⁱⁿ testing serum to see if it is up to titer, a given quantity of serum is mixed with a particular amount of venom that it should be capable of neutralizing. The mixture is then injected into mice. If they survive, the serum is considered O.K. These specific antivenoms have a dramatic effect. A person may come in comatose from cobra bite and in a few minutes is recovering following injection of serum. If a person is sensitive to horse serum, the injection is made intramuscularly or intradermally or even into the blood in an emergency.

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Feb. 1 It is felt it is better to risk an anaphylactic shock than take chances with the bite.

Dart & I walked over to the Oriental Hotel for dinner. We got to watching the geckos around the lights. Succeedingly, at the Princess Hotel, I have seen them crawling on the fluorescent tubes when the tubes were illuminated. I watched one stalk a small insect, perhaps 4 mm. long. The lizard crawled slowly to within $2\frac{1}{2}$ " and then "froze". Presently it elevated and writhed the tail. It then crawled forward cautiously to within about $1\frac{1}{2}$ " and froze again. There were no further tail movements. Suddenly the animal lunged forward and caught the ~~lizard~~^{insect} in its mouth. The tongue appeared not to have been extended. We saw other individuals use the tail movement on approaching prey. What might be its adaptive value, if any?

Feb. 2

Mrs. Praphanee and her husband, Mr. ~~Buranaph~~ Buranaphoka Kashemari, Chemistry Dept., Faculty of Medical Science, Univ. of Medical Sciences, Bangkok, drove us to Choburi along the SE coast. We left at 8:15 am. and returned around 5:00 pm. It was a clear, mild day (for this climate). We travelled in their little Volkswagen. I got many good pictures of water buffalo, including a group of them threshing rice, pictures of native huts, boats, etc.

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Domestic animals seen included dogs, ducks (great numbers - the eggs are larger and cheaper than hen's eggs), pigs, cows, water buffalo, pigeons. The town of Cholburi, a fishing village smelled of duck feces. Many shells of oysters (?) were seen and a variety of fish.

For much of the way we travelled along the west side of a freshwater canal. On the opposite side of the lined road were salt flats and several extensive salt processing areas. There were many huts with roof and sides covered with palm thatch (which Mrs. Praphanee said had to be replaced every 3 years. The thatch is not allowed in town because of the danger of fire. Huts were on stilts. Opposite many were large wind-mill like rigs for netting fish. Mrs. Praphanee said fish were scarce now because of overfishing. The fish are taken faster than they can breed. The decline has occurred in recent years with increase in population along the canals in the vicinity of the city.

There are now 2 million people in Bangkok and 22 million in the country. We also saw ~~a great~~ basket-like traps and hand operated tray nets, small editions of the

Feb. 2 large ones. There were also people fishing with hook and line. Others had dammed up shallow areas and were dipping water from one side to the other. Still others were wading through the dense floating growth. Both adults and children were involved. With this kind of activity going on every day, obviously few fish grow up to reproduce. Mrs. Praphanee said that only this year, have they started course work in conservation. But how can one get these poor people to give up fishing for a time? There are now efforts to culture fish to help supply the demand.

The huts along the canal were at the edge of extensive rice fields. She said the people rented the land for farming rice and ~~then~~ made out the rest of the way with fishing & milk from the buffaloes which are fed rice straw and grass along the canal. We saw numbers of these long-horned beasts wallowing in mud and eating grass. They seem to be docile and children were often seen astraddle their broad backs. One boy lay full length looking at the sheep.

Nearly every home, no matter how poor, has a small "spirit house", a model of a temple. ~~with~~ The houses are supposed to ward off evil spirits but many people no longer believe in spirits. They have a spirit house because it is the custom.

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Feb. 2 custom; ~~and~~ the house is like a good luck charm or rabbit's foot. Near many of the homes were haystacks of rice straw, and occasionally a pile of rice. The buffaloes are used to thresh the grain and the straw is worked out with rakes or pitch-forks. Then the rice is winnowed in flat baskets to get rid of the chaff. It is transported in small boats along the canal to storage sheds.

At Choburi we saw free-living monkeys ~~near~~ on a rocky bluff near the ocean.

They came to within 8-10 ft. to get food.

There are numbers of blackbirds with forked tail. They have been seen flycatching.



The birds are about 8-10 inches in total length.

We drove to a earth dam reservoir 15 kms. further south.

We drove around it looking for wildlife, since there were a few uncultivated stretches.

I was surprised at the scarcity of birds & insects. No reptiles or frogs were seen. Mrs. Prapheane has pointed out that it is the season of dormancy but it is certainly warm enough for reptiles to be active. I have seen small boys with sling shots. I suspect they are hard on birds. I saw boys shooting at swallows

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Feb. 2. and a man carrying a quack-like
bird. As in south Africa, bird life has
perhaps been decimated in the heavily
populated rural areas by "animal protein
hunger".

The Cholburi area goes in for tapioca
growing. The plant grows to a height of 6'
has a long nobby stalk and lanceolate
leaves (or leaflets). It reminded me of
manioc seen in Portuguese East Africa.
Are they the same? ^{yes.} The tubers are dried
and then pulverized.

At Bangkok there is a big program of
drain construction to get rid of the open water
of the canals. Malaria has been all but
eliminated. The mosquito vectors are still
around but are ~~not~~ rarely infected, according
to Mrs. Praphame. There is evidently no
schistosomiasis and elephantiasis is rare.
There is no yellow fever.

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Bangkok to Kuala Lumpur

Feb. 3 Left Bangkok on Malayan Airlines jet flight # 311 at 12:20 p.m. The crew was British. We flew at 34,000 ft. Flight time was 1 hr. + 55 min. Dart and I are travelling together.

Saw a magnificent meander in the main river near its mouth as we were leaving Bangkok. The river had nearly doubled on itself to cut off an extensive embayment. Many stream channels suggesting complicated blood vessel system.

We flew over water most of the way. Many small cloud puffs below. As we came in to ~~Kat~~ Kuala Lumpur, noted extensive tracts of what appeared to be original rain forest, even near the city. Much contour planting. Vegetable gardens. Temperature at airport 90°F. Scattered clouds.

Found a Ptychozoon-like gecko in my bathroom at the Federal Hotel. It had side flaps, ~~skin~~ and thin skin on side of tail and along rear side of hind legs. The animal was very agile and wobbled its tail as I brought my hand near for capture. It was a very pale olive gray, without pattern.

Dr. Dart + I took an evening walk. Great numbers of swifts were clustered beneath building overhangs. Colonial

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nests were seen, which proved the next day to be occupied by young or brooding adults. These swifts are sooty colored, have a white throat and rump and are a bit chunkier and larger than the white-throated swift of the U.S. The voice is comparable. Geckos were seen on the sides of buildings near lights.

Feb. 4 This morning at 7:20 a.m. swifts were hawking about the streets and restlessly moving about over the clusters of colonial nests. Two or three were sometimes seen clinging to the side of a building in a sheltered place, in contact with one another.

Called the Dept. of Zool., Univ. of Malaya. John Hendrickson left Jan. 21. Talked to Dr. F. S. Dhaliwal, acting head of the department. Phone - office KL 89-361, home KL. 52438. He says Draco can occasionally be seen even at this time of year.

The flying frog, however, is 200 miles away, along the coast. It is very rare.

At 10:15 a.m. we had an appointment with John O. Sutter, Asst. Rep., Asia Foundation (P.O. Box 921, No. 1 Damansara Road). Wm. T. Fleming, Rep. was not available. We found we were $\frac{1}{2}$ hr. late, not realizing there had been a time change between Bangkok and Kuala Lumpur. Thus this meeting was cut short.

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Mr. Sutter told us that a revision of the secondary school science curriculum was under way by a Syllabus Review Committee of the Ministry of Education, Mr. Tan Chin Guan, chairman of the Science subcommittee. The curriculum committee (jr. highschool level) has put out a report which, incidentally, it does not know is being acted upon. Sutter said the decision making power in the education field is very diffuse. Those who make the decisions are not always those in touch with science. Malaya, formerly part of British British Commonwealth, has strong ties with the British educational system. However, the ministry is becoming ~~more~~ Malayanized and is looking to other programs (besides British). There has been a large time lag between changes in science education in Britain, to keep pace with modern advances, and what happens in science education in British colonies.

I then went to the University, a beautiful new campus $2\frac{1}{2}$ miles out of town. At the zoology department I found Dr. Dhalwal and a circle of his colleagues discussing what might be done during my brief stay. I told them of my primary mission and of my desire to photograph

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Feb. 4 Draco. They felt quite sure that they could get native children to procure specimens but that they would be comatose because the children knock them down with blow gun pellets. However, I was assured they would still be able to glide. I learned that Ptychozoon is truly a glider and that it is able to glide from a perch to catch insects. The location of a nest was known and a plan was laid to go there. Mr. D. Wells, a graduate student in ornithology working under Dr. J. Medway (Office phone 89361, Ex. 244) told me about the gliding snake Chrysopelea paradisii which he says is quite common, although one does not often see it glide. It engages in glancing flight with its body held in a series of lateral undulations and its ribs expanded and belly concave. I saw a preserved specimen which was dark colored and flecked with numerous pale spots. The animal is very slender.

I was told they could stage an aborigine hunting with blow gun. A bamboo splinter is fired. The tip is poisoned with a brewed concoction from the "Ipoh" tree. The plant is mentioned in Binkley's, "Dictionary of Natural Products"

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I was informed that there were no large colonies of the fruit-eating bats around Kuala Lumpur but that smaller species roosted in trees. However, their fly out at night was not spectacular.

The swift (*Apus* sp.?) has undergone a population explosion because of the ideal nesting sites provided by the overhang of buildings. Such overhangs are rare in nature. This is view of Medway. Incidentally, Medway is a thin, narrow-faced Britisher in his late 20s or early 30s. His student Wells is working on breeding cycles in equatorial birds and ~~he~~ is familiar with Alden Miller's work. Wells is trying to perfect the laparotomy^{sp.?} technique.

I described the gecko seen in my bathroom and the group decided it was the common gecko about buildings.

Winnie Chien, Dept. of Zoology, Univ. of Singapore, Singapore 10, was present.

In the afternoon Dart and I return to Sutter's office and he continued telling us in on the educational picture. Mr.

Aria Nayagam is the Chief Educational Advisor. He was trained at Harvard

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Feb. 4 and ~~has attended~~ an international
educational seminar by the Asia
Foundation. He is a confirmed believer
in the British system. The Asia
Foundation (AF) hopes to give him a
broader view. He was labelled as no.
4 man in the Ministry.

Abdulha ^{Sahat} ~~Sahat~~, permanent secretary
is no. 2 man. He is a practical
type.

Aminuddin Bakir is no. 3,
a Queen's scholar, hence sold to the British
system.

Abdul Hamid Khan is no. 1, the
Minister of Education. He is perhaps
more open minded than the others because
his education ~~course~~ consisted of 5 yrs.
of high school and experience as a school
master. He did not have British
Univ. experience.

The curriculum committee mentioned
is made up of teachers who have taught
service. However, there is inertia in
adopting ~~these~~ new ideas by the policy
people.

Local people have been gradually
taking over posts held by British personnel.
Sometimes the replacements have been good
but often the new people have lacked the
know how of their predecessors.

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The minister (Kahin) has signed a Fulbright Grant agreement and ~~feels~~ feels educational exchange with the U.S. is desirable. He may be more inclined to recognize non-British education as valuable since he has not had a university education.

Nos. 2-4 have bias.

Last year for the first time free primary education became available. It is not yet compulsory because school facilities are not yet adequate. There is, however, a larger percentage of children in school than formerly. The school sequence is 1-6th primary, 5 years secondary. After the 6th year there is an examination for entrance into the secondary school. The exam. is deliberately designed to pass only 30% of students. There is strong control here, again I presume because of lack of adequate facilities.

In the secondary schools there is a test at the end of the 3rd year, following which successful students get a "Lower School Certificate" (end of 9th year).

"Form 5" is the school certificate given at the end of secondary school.

"Form 6" is achieved after 2 more years of schooling (post secondary)

Feb. 4 ¹⁷¹ These years would be equivalent to US 12th grade in high school and 1st year in college. The U.S. equivalent on the examination would be the college entrance exam.

Formerly Malaya had a college entrance exam, but it is now waived in place of "Form 6".

The number of people leaving Form 6 are more than the 2 universities can handle, despite the fact that there are 2-3 thousand Malaysians studying abroad in U.K. & elsewhere. There are staff shortages especially among the secondary school ^{science} teachers. Some teachers have been brought in from ~~the~~ India (Colombo Plan). (Probably not the best science teachers considering what we have seen in India). Some have come in from Australia. The Peace Corps is also helping. Any person who can teach science can get a secondary school job right away.

The secondary school science syllabus is based on the U.K. Cambridge examination and must be covered. Many of the textbooks are

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Feb. 4 old British texts and are too theoretical and inadequately illustrated. Foreign texts are picked up by libraries but are not allowed as texts in the classroom because they do not follow the syllabus. There are many government schools and the Ministry controls the syllabus, hence the program is rather rigid. Even the private schools must follow the syllabus. The present syllabus was adopted about 5 yrs. ago and is now considered behind the times by teachers. This led to the setting up of the General Syllabus ~~Review~~ Review Committee of which there are two subcommittees - the math committee and the Science and Rural Science Committee. The chairman of the latter is a former grantee of the AF who was sent to the U.S. to participate in a summer science institute dealing with PSSC materials. AF has supplied him with the new curriculum materials - PSSC, CHEM, CBA, BSCS (all versions), SMSC. He is Mr. Tan Chai Guan. He has made his recommendations and hopes to have experimental classes trying the materials but he has encountered a lot of red tape. In order for a school teacher

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Feb. 4 to use the new material he must get approval of the headmaster. Often the latter does not appreciate the value of the materials. There is an inspection system in the schools and use of materials without approval could result in the inspection system cracking down.

Each state in Malaya has a state science supervisor. He is usually a leading science teacher in one of the leading schools. He visits schools and gives advice but gets no additional pay.

A Peace Corps representative, a friend of Sutter's, was asked to react to the new curriculum materials. He felt there was much usable material but that it would have to be adapted to use in Malaya and could not ~~be~~ be taken on in unmodified form. The Corps is the only U.S. aid at the secondary school level. There is no AID. Malaya is not so underdeveloped and there is help from U.K.

The Science Committee referred to above has made recommendations at the junior high school level but is not ready yet to tackle the high school problem. It remains to be seen if the Ministry is going to accept the recommendations.

AF has been sending people to the NSF summer institutes in the U.S. For some reason all people sent so far have been in physical science. AF will urge broadening of choice of representatives.

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Feb. 4 with respect to subject matter. The people sent have been state science supervisors. AF will probably also send people to the academic year institutes in the U.S.

Last year the towns in eastern Malaya got "Form 6" so students could qualify for the university. There had long been a clamor for this.

Malay is the national language. It is planned to make it compulsory in the schools. English is also taught so the schools will be bilingual. All English materials will have to be translated into Malay - a formidable task.

There is potential hostility among the various ethnic groups - Chinese, Indians, and Malaysians. Common language may help to bring about unity but when first proposed as a school requirement, the Chinese objected. They agreed however, when they were threatened with loss of school support.

In the primary schools all languages are supported, hence this helps to ease tensions. The language problem has repercussions on the examinations. The 30% pass program has posed difficulties.

The 100% Malaysians feel they are the real residents of the country.

Feb. 4 yet less than 30% of the Malaysians were among the 30% passing the exam. There was more than 30% Chinese & Indian. Only the large urban high schools had science and the Chinese & Indians are concentrated in the cities.

Education is the biggest item in the national budget, topping defense. Formerly in black but last two years there has been a deficit because of the fall in rubber income. A crash program to build schools is underway, nevertheless

Most Malaysian teacher ~~less~~ training goes on in the cities and in England. There are two colleges for Malaysians in that country. ~~one~~ At least they existed before Independence. A new teacher training college near the Univ. of Malaya is replacing one of those in England. There is also one in ^{Bahru} Penang and one in Johore. These are junior high school colleges. Three training schools have also been established for the primary schools.

Malaya is a fairly well developed underdeveloped country. ~~They have~~ ^{It has} an ongoing science program as compared with ~~some~~ ^{most} Asian countries.

Sarawak and N Borneo may become eastern Malaya. Science is just now getting started there in the secondary schools.

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Feb. 4 Since the situation is fluid it might be a good place to test out new programs. In the fall it is expected that Sarawak, NE Borneo, Singapore and Malaya will become Federation of ~~Malayas~~ ^{Malaysia's} Malasia. These areas have in common currency, the British based school system, colonial background and language ties (~~Malaya~~ Malaya and English). It is thought that the Federation will help act as bulwark against Communism. Small, underdeveloped countries by themselves could fall prey to communist tactics. Singapore, Sarawak and Borneo territories will have considerable autonomy. This applies to education. Sarawak and N Borneo are less developed areas than remainder of Federation. It is hoped that in time the Federation will become more unified. The latter two countries are now engaged in a major English language teaching program and are likely to be receptive to new teaching methods. AF is supplying an American linguist as supervisor of the language program. The British regard American linguistics training as effective hence it

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Feb. 4 is evident that they will consider new teaching methods if they are convinced they are superior.

The few science teachers now in Sarawak are Indians that have been brought in. They will no doubt emphasize traditional methods. Sarawak has a difficult economic problem, thus schools are poorly equipped.

AF is interested in developing the testing program and will be sending out two examiners to foreign summer workshops on testing.

(?) AF is also involved in a half million dollar graduate science program in Singapore, a program exceptional because of its size. AF does not ordinarily supply buildings and equipment but in Sarawak it may help on equipment.

Malay government supported students who are studying abroad are all in applied fields - none are in science. Example fields are forestry, medicine, engineering.

AF might be interested in a pilot project dealing with the new curriculum materials. Sarawak or N Borneo might be good places to start. It might prepare sample sets of PSSC equipment, for example to be tried out.

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Feb. 4 Sutter read us excerpts from an analysis of the suitability of the PSSC materials for use in Malay schools written by Mohammed Ali-Isriahin. In general he endorsed the program but felt it could not work well because of syllabus restrictions. He did not suggest that the syllabus might be changed. A Mr. C. Ganasingam had wholly favorable comment.

Feb. 5 This morning we visited the Methodist Boys' Secondary School, one of the best secondary schools in the country. The pupils are Malayan, etc. It is a national type English medium school (other mediums are Chinese, etc.) There are 4 mediums. We met the principal Mr. T. Mori, a Japanese, and the senior assistant, Mr. Tan Hee Heng, evidently Malayan. The school was started in 1896 and was a private institution until 1922. Now in staffing, funding, etc. it is no different from other national schools. It is only nominally controlled by the Methodists.

Feb. 5. ¹⁷⁹ With the church and government involved, the school has many bosses. There is an educational secretary and a board of governors, responsible for running the school. The campus contains primary school, secondary and high school. In the afternoon a private primary and secondary school meets there.

The school includes Form 6 and is on the 6-5-2 (13 yr.) system. U.S. schools are on a 6-3-3 system. It is a boys school except for Form 6 which includes girls. The enrollment is 1100. It is one of few schools that offers Matriculation — the HSC (Higher Secondary Certificate). The Methodists have no program for teacher training. The Catholics do, however. All teachers in the school were trained in government training schools (a, ~~I suppose~~, were imputed). Most of the teachers were educated in Malaya. Some are from India but their degree is not recognized. Mr. Mori said some of the Indian teachers were well qualified, others not. The good ones after 4 or 5 yrs. should have their degree recognized, he feels.

All students get general science from first to fifth secondary year.

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In general science they study physics, chemistry, and biology. At the end of Form 3 (3rd year of secondary school) they get an LCE (Lower Certificate of Education). The examination given is run by the governmental Examination Syndicate and the exam. is national. If a student passes this examination he can go on to Forms 4 and 5. At Form 5 he takes the ^{HSC} ~~HSC~~ exam. If he passes he can enter the 2 yr. pre University course.

At the LCE students are grouped by performance. Those who do well in science enter what they call the "science stream"; those who do well in commercial subjects, the "commercial stream" - in the arts, the "art stream", etc.

In the special science stream the students go more deeply into science. Subjects available are math., physics, chem., botany, and zoology. In some schools the latter two are combined in biology. The Cambridge syllabus is followed. Two units are given for a principal subject, 1 unit for a subsidiary subject.

Feb. 5 Most students offer 4 principal subjects in science for a total of 8 units.

All classes have lab., one each week in each subject. In conducting the lab. the Teacher can add, subtract or otherwise modify his approach as long as the syllabus is covered.

There is periodic review of the syllabi by the Exam. Syndicate of Cambridge. In biology we were told, the exams. emphasize 'local forms'.

It is difficult to get good teachers because the better students go into positions that are more lucrative and offer more prestige. If a man is good in chemistry, for example, he goes into industry where he gets good pay and has status. Some people trained in science go into administrative posts which is a poor use of scientific manpower.

We visited several laboratories in session. The chemistry lab was a large converted classroom but seemed well equipped. Long sturdy tables with chemicals, plenty of work space, sinks, gas (produced from petrol), were noted. The room had a high ceiling and ~~big~~ fluorescent lights, small and situated

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Feb. 5. lights up. On gray days (which must be frequent), there would be rather poor illumination. The walls were light-colored. There was plenty of blackboard space and a good storeroom supply of glassware and chemicals. Each student has a locker and equipment he shares with a companion but on exams the students work separately. The class was analyzing a lead acetate solution. They were also working with silver nitrate. The lab is in heavy use from 7:30 am. to 9:30 pm. The chemistry teacher showed us a list of experiments designed to cover the topics in the syllabus. Chemicals are supplied by the government. #

The physics lab was also roomy, with high ceiling and high light fixtures, airy and light colored. Electric outlets were adequate. Tables were movable.

The biology lab. was somewhat smaller than the other two but was roomy, had adequate table surface, sinks & running water, adequate light, and plenty of blackboard space. Reference collections of local animals were sketchy, however.

Feb. 5¹⁸³ The students were dissecting the cranial nerves (5th & 7th) of the dogfish and were using as text "Animal Biology" by Grove and Newell, London. Each student had a personal dissecting kit and most were drawing the nerves in question, having completed their dissections. Tables in this room were fixed. ~~Each~~ ~~student~~ A compound microscope is available to every 2 students. Scopes are kept in heated cupboards because of the problem of mold.

Long said many students want to study science. It is a world trend. Biology students go on field trips and collect and write notes about the local flora and fauna. Trade schools are not popular. People do not want to work with their hands. Social value is attached to white collar and professional work. ~~Many~~ Many want to be doctors and "all" want to do science whether they are good at it or not.

We then went to the Ministry of Education, where we met the top people, Abdul Hamid Khan, the Minister of Education (no. 1), Aminuddin Baki Chief Educational Advisor (no. 3), the

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Feb. 5 ^(?) Deputy Permanent Secretary, Abdulla Sahat and Eames - Hughes - U.K. Administrator, formerly Permanent Secretary. ~~of the Committee~~ (the chief executive position in the Ministry) and now secretary of a committee on the Needs of Higher Education. Mr. Sutter sat in. Dr. Dart opened by presenting the reasons for our visit. All listened attentively. When discussion got under way Baki proved to be the most talkative. Khan seemed inclined to let him carry the ball. Khan is a slender, dark-skinned, older man, perhaps in his late 50s. Baki is short, stocky, light-skinned full-lipped, energetic person. Sahat and Eames - Hughes were silent.

Dart urged that the syllabus review committee get some scientists to work closely with it. At present only non scientists are involved except for slight participation of scientists as advisors.

Baki mentioned that there could be little change because of the syllabus and seemed to feel change would have to come from Cambridge.

Feb. 5. Sutter, who knows these people well felt we had gotten across our message and that it was well received. Baki asked to borrow ~~the~~ a copy of "guidelines" which he will return to me Fri. evening.

Sutter informed us that there are a variety of religions in the country - Christian, Buddhists, Confucian^{sp?}, Islam (Muslim), Animist.

The latter imagine all kinds of good and evil spirits in the forests.

The forest people living in long-houses, are tired, cut and slash to clear ~~and~~ area, farm it for 2 or 3 yrs. and move on.

Dr. Dair told an interesting story about the introduction of a new strain of rice from Japan into Nepal. The U.S. (I believe) agricultural advisors offered the rice to the people of a small village. The rice gave a greater yield and was more resistant to rust, etc. (at least in Japan) than the rice the Nepalese were accustomed to growing. The people tried the rice for about 2 years and then gave up planting it despite the fact that there was an increased yield and

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Feb. 5 at least during the brief trial no pest damage. When the matter was investigated it was found that the grains tended to adhere to the stems more than the local rice. This led to problems with threshing which was a ritualized community effort with religious overtones, hence, since the people were not in dire need they just stopped planting and didn't feel called upon to say why. Dart emphasized the need to have social scientists working with Technologists. An oversimplified approach can get into trouble. This sounds like the way some specialists, such as pest control people, attack problems in the area of ecology. The approach is usually direct and does not take into account ~~all the~~ possible interactions in the ecosystem.

Dart also commented on a political matter - recognition of Communist China, when I asked, "If I were a political scientist could I go to China to study?" He said "No, even if you could get an invitation, our State Dept. would not

Feb. 3 ¹⁸⁷ permit it since we are not
on speaking terms "with China"
(mainland). Dart feels that because
we do not approve of a government
this is not a good basis for refusing
to maintain open channels of communication.
Communist China holds Americans
under arrest and is engaged in aggression
but Russia has engaged in aggression
yet we recognize her. Even if the
people of the Chinese mainland are at
the gunpoint of gangsters, the present
government is the government of China
whether we like it or not. Recognition
doesn't mean approval. Perhaps
the Chinese on Formosa are at gun
point. Certainly the area is heavily
militarized. Maybe Chang's government
is not approved. Maybe the people wouldn't
want to invade the mainland. Maybe
these people are at gunpoint, yet we
recognized the Chang. govt.

Dart pointed out that when the
Communists came down from the
north they brought with them agrarian
reform and they got much support
from the people. Chang. had been
heavy on taxation and the little

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Feb. 5 man got nothing in return. His government were pretty corrupt. State Dept. people in Asia at the time (one a classmate of Dart's wife) reported the acceptance of the Communist program. This is not what we wanted to hear. These people were labelled as pink & McCarthy went after them. Dart's friend lost everything - career, stature, etc. Many years later he was able to get his case before the U.S. Supreme Court and he was completely exonerated but the damage had been done. It is now known these State Dept. people were right. The State Dept. now may wish to change its view somewhat but the U.S. public lags. They have been over sold on the idea of not recognizing China. Dart feels that despite our pressure tactics to keep the China question off the UN agenda that sooner or later it will come to a vote and we will lose. If China gets nuclear power ^{before this}, then why should she join a nuclear control system?

Feb. 6 Today we visited a secondary school in Kuala Lumpur, the Victoria Institution. Mr. Allen Baker is the Headmaster. He is a large, husky fellow with black hair and pale skin and is from U.K. The school contains grades 7-12th (Forms 1-6). Girls occur in Form 6 but all other classes are attended by boys only. One of their crying needs in Malaya, says Baker is graduate science Teachers. He mentions that some 5000 PhDs from U.K. have gone to America to stay. He evidently wishes they would stay in U.K. or he could get some in Malaya.

We learned of a Mr. L. R. Allen, a New Zealander who has written a textbook in biology modelled after the BSCS materials. New Zealand authorities are evidently switching over to the American science teaching technique.

The school is on the Cambridge syllabus system but we were told that the latter prescribe subject matter and order of treatment and that the development of the topics is up to the teacher.

In the Form 6 "science stream" both botany and zoology must be studied.

The Cambridge exam is given in Dec. but the students do not get results until Feb. or Mar. Headmasters in England are allowed to work out their own syllabus but even there they ~~are~~ are bound by the exam. In Malaya there ~~is~~ ^{was} no such latitude.

Cambridge will consider modifications suggested by a region but there is no opportunity for a given region to experiment before suggesting modifications.

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Feb. 6

We visited a general science lab. with 45 students. The text in use was "Daniel's General Science," Oxford Univ. Press. (Books 1-4). The book was written by Daniel in Malaya where he taught for 25 yrs. In one classroom we saw only 11 students. We were told these were a ~~special~~ group of superior students in a special general science class. The Federal Inspectorate will approve such classes only if the school has proper facilities and equipment. These students are called 2nd credit students. Other students meeting the normal requirements are called 1st credit students. The special students still follow the syllabus.

We then visited a Form 6 chemistry lab. There were 25 students. Each had a personal set of laboratory equipment. (In general science, 2 students share a set). They were doing a displacement reaction using copper sulphate and zinc. It was a review exercise of material they should have learned in an earlier course.

Classes have outgrown facilities. Originally there were 15 ± students to a class; now there may be 45.

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Feb. 6. The government plans to build more schools. It is not expected, for example, that the Victoria Institution will expand.

We met a slender, enthusiastic, bright young Senior Science Master, Mr. Yeoh On Chye, a biologist trained at Queensland University, Brisbane, Aus. Senior science master's ~~are~~ maybe scholarship students assigned to schools by the government. He showed us about the science labs.

In the physics lab was a motto over the blackboard that read, "Theory without practise is empty" "Practise without theory is blind"

Baker said there is no use in increasing number of schools giving Form 6 unless university offering is increase. Universities could not handle increase. He said that at one time in Malaya teaching had high prestige but that now the profession competes unfavorably with industry and governmental positions. Since education is at high premium in Malaya, the populace is grateful to those who elect to go into teaching but they are, nevertheless not accorded prestige.

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Feb. 6

Baker laments the fact that there is a big difference in pay between an honors graduate and a non honors one. The former can handle only one subject and the latter can handle several.

Mr. Allen remarked that he has been impressed by the business-like approach of Malaysian children in contrast to children in New Zealand. The former appreciate the great opportunity of getting an education; the latter take school for granted.

We visited the biology lab. I think it was the best equipped lab. I have ever seen. Biology is covered in Form 6 over a period of 2 yrs. There is much practical work. Chye, a biologist, was obviously especially attracted to this laboratory and his touch was obvious everywhere. He bubbled with enthusiasm. We saw the following: Many visual aids - slides (2x2 + larger), slide project, microprojecta, opaque projecta, Bell and Howell movie projector, plaster models (some made by students), incubator, refrigerator, storages, battery jar aquaria with live fishes, 33 compound and 18 dissecting microscopes (kept in an conditioned room), 3500 prepared slides in

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Feb. 6 botany and zoology (microscope
slides), freezing and paraffin
microtomes (all new equipment),
sizeable collection of plants and animals
mostly made by students, well labelled
as to collector, locality, date, and identity.
The students (special ones) had done a
study of chick development and had
illustrated it. The class has worked
with developing toad eggs. There is sometimes
time for extra work at the beginning of
the semester. The class takes field trips
outside of school hours. ^(17-18 yr. old students) They had recently
made an ecological study of a mangrove
swamp, replete with photographs, drawings,
graphs (bar and transect) and even
a mock up of the swamp on the front
table. This study involved food chain
analysis. Specimens collected are preserved.

Incidentally, one of the mangrove plants
is Rhizophora mucronata, one of rare
viviparous species, that drops its embryos
into the mud. The radical is lance-like
and sticks in the mud. I saw this
species (or a related one) on Suva Island
in 1958.

Like the other ~~labs~~ labs, this one
was very large, airy, well lighted,
had plenty of table & sink space.

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Feb. 6 There was a desk lamp for each student. Blackboard space was ample. 32 students could be accommodated. Texts are - Animal Biol., Grove and Newell; Textbook of Botany, Lowson and Sahni; and Animal Biol. for the Tropics, Purchon.

The students have cleaned and mounted skeletons of dog, cat, etc., have prepared study skins.

They are encouraged to join the "Nature Society", a federal society with branches in each Malayan state.

We also ~~saw~~ saw physiological equipment including respirometer. Mr. Chye said excellence in equipment depends a lot on the teacher - if the teacher is enthusiastic and goes after it, the government will come through.

Glassware, incidentally, is obtained from England or Europe (Germany). Locally manufactured glass is inadequate. Schools can no longer import glassware, etc. ~~at~~ duty free. Science students cost the school about \$10 each a year (\$20 for Form 6 students).

There are about equal numbers of arts and science students in the school.

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Feb. 6. Guan must OK orders for equipment. No question about VI. but some of the new schools must be looked at closely.

The Form 6 science building of the school was built in 1955. VI. became a government school in 1936.

Mr. Allen told us New Zealand brought men from MIT in U.S. to help with PSSC program there. Biology program (BSCS) to come. The programs have great appeal in New Zealand because equipment is not expensive.

Changes in science teaching may come in England first and will then permeate Malaya. However, our feeling is that Malaya should not wait, if it feels change is desirable. Guan says they are watching curricular changes in U.S. with interest and are engaged in syllabus review in Malaya, however, no scientists are involved as yet.

Guan's feeling is that the groundwork should be laid first and then they will call in scientists for advice.

Both Dart and I felt that perhaps by then the program would have become crystallized by non-science people and suggestions by the scientists might not be followed or the scientists might merely accept what had been worked out.

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Feb. 6 In the afternoon we went to Medway's (Lord Medway) place on the Gombak River in the Gombak Forest Reserve, about 12 miles ^E~~out~~ of Kuala Lumpur. Only 5 or so miles out of town we got into wild country mixed with rubber plantations. The latter are arranged in contour rows and are in "fall" colors. Wells says there's not much wildlife there because of the heavy spraying. Dr. & Mrs. Dahlwal and Wells accompanied us and provided transportation.

We left the main highway, a two lane paved road of excellent quality and followed a two-wheel track down into a canyon in rainforest where we photographed a somewhat Europeanized aboriginal family - parents and 5 children. The site was a few miles from Medway's place. The man collects birds for Medway. The woman was weaving a mat and the man cutting bamboo to make a bed. The baby emulated his father by hacking at a sapling with an 8" knife, a rather terrifying plaything for a child around a year old. Their home was in the deep shade of dense jungle and was of plant materials and built on stilts.

Feb. 6. The man's skin appeared to be infected with a fungus. He had large mottled areas of paler skin over his back. We saw many colorful butterflies, several snake-like lizards, whip scorpion, ants (one species that builds galleries of loosely knit plant shaft on plant stalks), termites, tubes, some extending to the tops of the highest forest trees. It was warm and the air heavy, probably from high humidity imparted by the rank vegetation, despite the fact that it has not rained for 4 or 5 days. This is considered a drought! We heard cicadas, sounding like a buzz-saw, and a ventriloquial sound from the tree ~~top~~ tops that had a dull, rhythmic quality, which we failed to identify.

Medway's place is on a lawn covered beach in rainforest about 12 mi. E of town. Dart & I spent the rest of the afternoon and evening there. Wells attempted to get Medway's aboriginal servant to put on a loin cloth and act out a blow gun-hunting procedure for me but failed. Later when Medway arrived we found out that he was refracting because he did not feel he was sufficiently skilled to represent his people and did not want to create a wrong impression. Medway finally persuaded him we were not engaged in a big production and he emerged in native garb and put on a fine show. I got shots of the use of the blow gun and of the rainforest across the canyon.

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Feb. 6 Medway talked about various aspects of the natural history of the area. There followe snatches from memory. Teyirs have come to his yard on 3 occasions. One time his native woman servant was so frightened she dropped her child and ran and then was embarrassed afterward. Teyirs are attracted to the fruit of the durian tree. Several of these tall trees occur on Medway's property. The leaves are dark green and the tree may be over 100 ft. high. The fruits have a stringy, spiny covering, are about 1 ft. in diameter and have a sweet smell. The teyirs are said to eat them. and the aborigines are on edge during the fruiting season. Teyirs kill about 10 gnomines a year. There are not many around Medway's place because game is scarce. An adult & a kitten are known to be present from tracks.

The rhino in Sumatra can be written off Medway thinks. An adult is worth ^{\$}10,000 U.S. - hide, horn (as an aphrodisiac), meat. A poacher was fined \$3000 for killing one. He was still well ahead. There are perhaps 60 left in Malaya. The Slim River area is the best place to see them.

Cobras, ~~pit~~ vipers and back-fanged snakes are venomous species here. Medway says there are no kraits.

Feb. 6 ¹⁹⁹ Draco stays mostly near the crown
of tall trees but obviously does come down
since it lays its eggs in the ground.
It basks on bright days and scurries
around to the other side of a tree trunk
when approached. It ~~bob~~ bobs and lowers
its yellow dew lap. In thick rainforest
the chances of seeing one are slim. Boys
bush them down with blowgun pellets.

At dusk bats began to fly - a species
about the size of a small Myotis and a larger
one with a 1 ft. span, cicadas sang (buzz saw
sound), and Bufo asper began its barking
"conk", a single note that might be considered
bird-like. Actually the jungle was mostly
quiet, very different from the Hollywood version.
Blue green flashes of fireflies were seen.

Medway and I waded up the River to
look for frogs. I soon got the eye shine
of several toads and collected one large adult
Bufo asper. In the faster water were Torrent
frogs (Stauros larutensis) sitting on glistening
wet boulders within 3-4 inches of fast water.
They were only an inch long but gave a tiny
silver eye shine. I saw 3 or 4 and all
faced water. I formed to catch them I
had to keep them in the light and to approach
from down stream. Medway said to look
for Rana macrodon on gentle benches near
the stream and I finally got the shine of one
and caught it in a clump of vegetation 4 ft
from the river.

Although with arms & legs exposed, an
invitation to biting insects we were not
attacked. Perhaps it was because of the
dry spell. There are malarial-carrying

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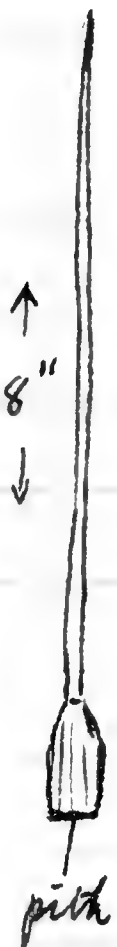
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mosquitoes in the area.

Medway said it was dangerous to enter the river after storms because of a rickettsia that is carried by rats which deposit urine and feces on sand bars. When the water rises the organism is carried in the water and may infect humans through the mouth & nose or cuts. It causes jaundice and sometimes central nervous system involvement. It is sometimes fatal.

The blow gun is a 6-8 ft. length of bamboo with a bore $\frac{3}{8}$ " in diam. The dart is a tapered bamboo splinter with sharpened point and pith base. Plant down (and more recently cotton) is used as wadding behind the pith base. The mouth piece is broad, perhaps $1\frac{1}{2}$ - 2" in diameter and presents a flat surface. The dart tip is dipped in a emulsion from the Apok tree and heated. The poison darts I inserted into a honey comb of tubes (of bamboo?) in the bottom of a bamboo quiver covered with a woven cap which holds the down. Darts about to be used are stuck in the hair. After firing the hunter may quietly hold position until the victim is paralyzed. A good marksman can shoot accurately a distance of 30-50 ft. The dart may penetrate flesh $\frac{1}{2}$ ".



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In his backyard Medway has a garden of corn and Tapioca planted by his aboriginal family. The plants are in random arrangement. He has two tan-colored dogs with small fox-like ears and short straight hair. These larger one stood about 1 ft. high. He said these were the dogs of the aborigines and that their line could be traced back, virtually unchanged to the neolithic.

The jungle frog Galler g. galler and the gibbon occur near his place. We heard a pheasant and a barbet. There are some 12 species of rats. It is said there may be 100 species of trees per acre in rain forest. He expected to hear a whip-poor-will at dusk but it did not perform. The black panther is fairly common ^{as} ~~and~~ is the spotted form.

We dined on tapir stakes roasted over a wood fire outdoors.

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Around 10:00 a.m. visited STTI (Specialist Teacher's Training Institute) on a knoll S of town. Mr. J. Allen, the headmaster, showed us around. He is a husky, blonde, balding man in his 30s(?) with English accent, evidently a U.K. man. Among topics covered by the school are domestic science, librarianship, physical education, training for handicapped, etc. ~~Science~~ Science training has been part of the program but is going out since all science is going to the ^{Penang?} Penang(?) - Malayan Teachers College which will have a science bias (including math.).

Allen feels the Cambridge syllabus - exam. combination is on the way out. The Federation of Malaya Certificate will replace the Cambridge Exam. Indeed it is running parallel to it now. He feels that there are not enough experienced people to try to run programs like PSSC, etc. We pointed out however, that if interest developed and a request came to the U.S. for specific kinds of help that the Ford Foundation, Asia Foundation, etc. could probably help get U.S. people to assist in the program.

Allen feels that Malayan scientists

Feb. 7 and technologists are not sufficiently well qualified to update science materials in Malaya.

The school itself was a fine modern structure, as excellent as most I've seen in the U.S.

~~We had~~ Allen commented on the old tin mine dumps near the school, pointing out that in the old days the tailings were put anywhere it was convenient. Now the mining companies are required to restore the landscape. He said the rubber tree is deciduous but it does not lose its leaves for long and the individual trees are not synchronized.

Drove to the Selangor Club to meet Mr. Jack E. James of the Asia Foundation and his assistant, Mr. Sutter. James has a home in Marin Co., is on the board for the Marin Co., Museum, is much interested in natural history. He was raised on a Kansas farm and told how he early learned the risks involved in use of insecticides - long before Rachel Carson. His father sprayed to get rid of a fly and got a larger one instead. James, in my opinion has a good ecological outlook. He lamented the fact that his neighbor in Marin was landscaping with a bulldozer.

In Kuala Lumpur one sees the Islamic influence - there are mock-towers on many buildings. The fast - "Puasa" (Malay) or "Ramadan" (rest of Muslim world) is

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Feb. 7 going strong - all govt. offices close at 1:30 - 2:00 p.m. No food or drink can be taken between sun rise & sun set; after that O.K.

The tri-cycle motor scooter taxis of Delhi, Karachi & Bangkok are not seen here. The tri-cycle rickshaw of Calcutta is, however. It's Chinese New Year's. The firecrackers are reaching a crescendo today.

Feb. 8 Dart left this morning for Singapore and Hong Kong. I will go to Kuching, Sarawak, and Manila via Hong Kong during the remaining days of the trip.

Visited the Peace Corps people today - Mr. Butler, the director, his Assoc. Rep., Mr. Thomas A. Sullivan and two secondary school teachers, David Sterling from Birmingham, N.Y. and Arnold Deutchman, N.Y.

Butler is a tall balding man in his early 30's, a former Republican lawyer from San Francisco. Sullivan is a raw-boned, black haired, thin man in his 30's, from Kansas. He has been here only 1 mo. Deutchman, a young physics teacher, had been here 8 mos. and Sterling, a biology teacher had only been actually teaching for 2 weeks. Deutchman was the most helpful to me.

Feb. 8 The first group of Peace Corps people came in Oct. 1961. There were 36 people. This was followed by a second and third group numbering 31 and 51, respectively. The headquarters of the Malaya project is N Illinois Univ. The tour of duty is 2 yrs. These people live just like the people in the country they enter. They get no special privileges. Assignments Nov. 1, 1962 were as follows: Doctor (1), Nurses (31), Laboratory technicians (7), Ministry of Education: Architects division (2), technical college staff (4), secondary school teachers (33 - 24 in science or science - math, combination). Vocational instructors (4), Librarian (2). Ministry of works, posts and telecommunications: Public works department (12) - heavy equipment operators, machinists, surveyors, engineers, architects, road construction, road quarrying, etc. There are also people in mechanical trades, radio, business administration teachers, medical assistants animal husbandry, soils, forestry, etc. As Sullivan put it, ~~where~~ where else can a young engineer just out of college have the opportunity of cutting a road through raw jungle? I just hope that our influence will not lead to "overengineering" as is occurring in the U.S., in my opinion.

Out of the 35 teachers, 6 are career teachers.

From Deutchman I got the following comments: A teacher can pretty well anticipate the questions on the Cambridge Exam. because they reappear.

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Feb. 8 In view of the number of topics to be covered and knowledge of what to expect on the exam. Deutchman finds he can cover the syllabus in $\frac{2}{3}$ or $\frac{1}{2}$ time allotted for course, thus he feels there could be time for innovations. For example in upper & lower Form 6 there are 9 ~~periods~~ and 8 ~~week~~ periods a week, respectively for physics and the students will have had already 2 yrs. of physics at 3-5 periods a week. The amount of time spent in practical work is up to the teacher. It is usually 1 lab. a week (2 periods in length). He feels PSSC would not fit into present physics program, yet at same time he said Headmaster & teacher have great latitude in setting up work.

There is a great suspicion with respect to the value of American education among Malaysians. A U.S. degree is worthless (or nearly so) unless it is of a specific type from a specific place (Harvard, for example). Razgum is a fervent supporter of the U.K. system. However, he is to be sent to U.S. Perhaps this will temper his view. All Malaysians seem to want to go to the U.S.

Deutchman feels the best approach

Feb. 8 to bringing about modernization of science education is to bring key people to the U.S. They will go back and work for changes. This is better than for us to try to bring about change directly. He suggests using the approach of the summer seminars (NSF) to which senior people can be brought.

Ministry people in Malaya are terribly busy. Tan, for example, is cruelly overworked. There are few good people. As a result, they have little time to give to curriculum reform, new ideas, etc.

Deutschman said the Malay school teacher is in general not devoted to his work. He seeks every opportunity to slough off - does the minimum to cover the syllabus.

He feels it would be a great boon to the country if some philanthropic agency could print American text books, new curriculum materials & other reference works in inexpensive form. The Malaysians cannot afford to buy our books.

Sterling referred to the secondary school program in science as a "tunnel" education. The student emerges knowing the configuration of the surrounding walls but knows little beyond and desires to explore little beyond.

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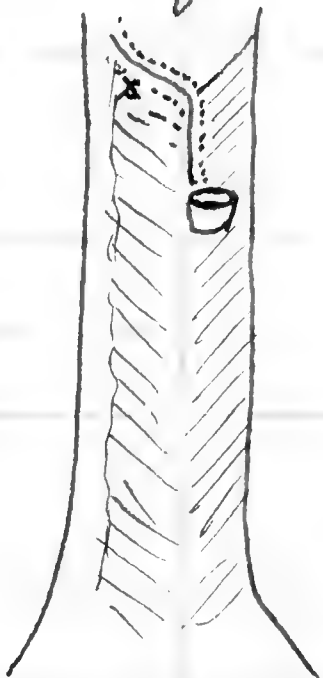
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Feb. 8 Deutchman feels BSCS, PSSC, etc. are oriented toward preparing students for college careers in science. This is not needed on such a grand scale in Malaya. U.K. equipment to outfit the secondary school physics course is about 10-12 times more expensive than U.S. (\$25,000 vs \$2,000) - PSSC approach.

Form 5 exams. mostly repeat experiments done before in class.

Feb. 9 Dr. Dahlwal and Dave Wells drove me to the sea-coast town of Klang and thence $4\frac{1}{2}$ mi. north to a coconut grove where Wells has seen Draco. Enroute we passed through many rubber plantations. The milky sap was being collected in some groves. The tree comes from Brazil. There is no native rubber. A fresh cut is made each morning. The sap flows for 1 or 2 hrs. into a small collecting cup. The ^{contents} cups are gathered thereafter, and the cups turned ~~over~~ down. One can see the old scars from previous cuts. Cuts are started at a height of 6-8 ft. and end up near ground level.



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Feb. 9 Young trees are planted close together and sap is drawn at an early age. As they get larger they are thinned out. Wells says sometimes the leaf fall is pretty well synchronized but that soon the trees are decked in fresh green.

We also passed through old tin mining dumps near K. L. Tin is mined by the "Placer" ^{U.S. term} method. A jet of water is sprayed on the ore-bearing shale and the shale is carried down troughs with cross cleats. The tin lodges behind the cleats. The procedure is like "Placer" mining for gold in the U.S. Tin is a breakdown product of granite.

In the hills are a few fertile valleys, the soil of which can withstand repeated plantings but in general the soil will take only 2 or 3 crops and then must be treated with fertilizer or abandoned. There is much red lateritic soil in Malaya.

I learned that the population of Malaya is something over 6 million, and the ~~country~~ ^{country} is regarded as sparsely populated.

See species account for observations on Draco. The Indian Crow was introduced in Klang about 60 years ago to control rodents. The bird persists and is now considered somewhat of a pest.

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Singapore to Huching, Sarawak

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Left Singapore airport at 7:45 a.m. on MAL Flight #488 (4 engine Viscount), after our night stay at Ambassador Hotel. Met a Bob Ammon of Standard Oil Co., New Jersey, returning from conference in Australia. At least in the oil field he doubts the wisdom of stressing basic research in chemistry in India. Why put effort in on something the West has a huge lead on? He did concede, however, that in other aspects of chemistry such as that ^{directed} toward exploitation of potential of native flora, basic research for Indian chemists makes sense.

Flight over Singapore brought to view large tracts of coconut palms, banyans, and generally lush green aspect mingled with both modern and old human structures. According to Dave Wells, Draco is to be found in Singapore.

Flew out over an archipelago set in pea green water. The bottom can be seen around the islands. - water ^{crystal} ~~crystal~~ clear. We are flying at 15,000 ft, above more or less extensive cloud cover.

Thin cirrus above us.

Fellow travellers on plane includes a few cockroaches.

As we came over the southwest tip of Borneo we encountered rough weather. It was the roughest plane ride I've had, perhaps exaggerated a bit by the fact that

Feb. 10 I sat in the last seat. A few anxious moments as we bounced and swerved down through the clouds. It was raining and the cloud ~~ceiling~~ ceiling was at perhaps 500 ft. Coconuts and nipah palms seen as we came in for landing. We also crossed some mangrove(?) swamps and tortuous turbid rivers. Everything wet. At the airport were two mobile guns on caterpillar treads - tank like vehicles and at the hotel military personnel were seen. This is an area of unrest.

An overcast dreary day.

About 5:30 went out near my hotel, the Aurora, and looked about. Found the sensitive plant again, some in bloom with "fuzzy" pink blossoms, growing like a weed along the border of a play field and drainage ditch. In a hedge row tangle, I found 3 leaf ant nests (*Oecophylla*). The ants had bound up a cluster of leaves to make a compact mass 3-4" across. "Kerenga" (Indian name). The ants stood about on and near their nest. They were inactive because of the overcast and rain. When I put my hand in to feel the nest two were soon on me. A slim striped lizard with bright lemon yellow throat and neck was seen about 3 ft. off the ground on the S side of the growth but it dropped out of sight when I prepared to catch it. It was ~~colored~~ colored much like *Gerrhonotus gularis* but had duller scales.

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Feb. 10 There were snails of two species crawling about over the wet vegetation. Numbers of birds were heard and seen, one a swift. Mr. Dickson, the Director of Education told me that the swift that makes an edible nest from its saliva is here.

At 6:00 p.m. Mr. M. Dickson arrived, as planned, at my hotel. We visited for about $3\frac{1}{2}$ hours and had dinner together. He is the Director of Education for all of Sarawak and has been here since 1947. He is a man about early or mid 50, shorter than I but stockier, has dark, graying wavy hair, brown eyes and a thin straight nose. He was very friendly, attentive, and informative. He speaks with an English accent and is of British origin. He commented on a variety of topics.

When I described "guidelines" and the new U.S. curricula and asked whether there was any desire or opportunity to experiment educationally in Sarawak, he remarked that he felt there was less chance here than Malaya because of the backward condition of education. They are just now trying to get science started and are getting some advice from people who have worked in New Zealand. They have a syllabus, recently published, which they plan to use. He felt it important in such an under-

Feb. 10 Developed country as Sarawak to have the binding influence that uniform standards of education would help to bring.

There would be strong objection to the kind of experimentation I described because such a premium is placed on meeting the questions prescribed. The Catholics are especially efficient in covering all loopholes. They examine past examinations, check all books ever ~~used~~ ^{on} used, ask for advice ~~and~~ what books may be used. They may start students many years in advance on certain topics, knowing that in the end they will be on the exam., in the hope that they can get their students through. Dickson tries very hard to come up with new questions and the examinations become a game between the teachers and examiners, each trying to outwit the other. The Catholics would be opposed to the program I describe and would, as they have with other efforts to bring change, try to impede it, Dickson thinks.

The reason there is such a drive toward passing the exam. is that success can mean a government job or other favored position. It can mean the difference between a quibbling existence and living well.

I described the experiment on sorting time in slides, described in the ~~the~~ "guidelines," and asked if questions could not be devised to test the ~~other~~ ability of the student to proceed scientifically to get an answer to a question. One might say, "If you

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Feb. 10 wished to find out what the effect of soaking time was on the germination of corn, how would you proceed? " The student would be graded on the soundness of his approach and presumably those who had had laboratory experience in the lab. would be the more successful.

Dickson liked the idea.

I described my work with elementary school children on biological topics outdoors. He said students in Sarawak have little interest beyond collecting. A few enjoy that part but then they lose interest. Such studies would be regarded as useless because they would not help on the exams.

Evidently the school sequence here is as in Malaya - grades 1-6, elementary, then come the Forms through 6. After Form 3 (the 9th grade) comes the LCE (Lower Certificate of Education) exam., after Form 5 the HCE and after Form 6 (2 yrs. in length), the University entrance exam.

There are both government and private schools. The government has a program of aid to the private institutions, really a very substantial sum in view of the small size of the country.

Dickson is obviously unhappy with the attitude of most of the Chinese. They stick together and ^{are} not desirous of

Feb. 10 becoming assimilated by the country. They want to stand apart and resist educational processes that would lead to them merging with the rest of the population. They look down on the Malays and rather picture themselves in the role of a colonial power as the English in Australia. They produce unrest by calling attention to the fact that many Chinese work hard and yet ~~have~~ have a poor existence, yet "they", a term not well defined work short hours and have big shiny black cars. They begin with the young children and the process of indoctrination of hatred goes on through their schools. Those who look promising as leaders are picked and soon they have aggressive, active supporters of Chinese Communism. Actually, Dickson says the Chinese are well off. Recently, during the Brunei revolt, they locked up a few for security reasons, just as Singapore has done.

The ethnic groups and religions here seemed to be as in Malaya. There are Malaysians, Chinese, a few Indians and English. Religions are Muslim, Christianity, Animism, Animism centers around the rice paddy. About $\frac{1}{3}$ of the people are Dayaks, the first descendants of the aboriginals that first came to Borneo. These are mostly hunting and food gathering people but they now have paddies and fill out with hunting. They live in long communal houses and are pagan. The sea Dayaks engage in fishing.

Dickson commented on the uprising in Brunei, a rich country with so much revenue

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from oil, the sultan had provided free school lunches, free education, pension system, etc. The cause of the uprising was not clear. The rebel leader wasn't even in the country when it occurred, hence it was abortive and was quickly put down with little blood shed. Suggestions have been - The communists were seeking power, the people were dissatisfied (yet the sultan was liked and had done well for the people), it was a camouflaged Indonesian attack. Some of the people in northern Sarawak became involved. Why did they help?

Dickson went into the history of Sarawak a bit. There have been 3 English Rajas, the first was a good man who gained great respect and whose influence to this day causes the people in the longhouse to be friendly with the white man. He stopped piracy on the high seas, for which he was criticized as a meddler by the people in the home country. His son also was a good ruler. The last Rajah, who is still alive, and who finally decided rule by a single family was an anachronism, should have educated the people, but didn't. Dickson thinks little of him.

Head hunting is passé. Formerly it was a way of showing bravery and there were religious connotations. The women apparently encouraged the men in head-taking. They

Feb. 10. would taunt those who had not taken a head. When a head was brought in they would play catch with it. Heads were sought among enemies and a woman's or child's head indicated the hunter had gotten in close where there was great risk. Heads were given offerings of food and were treated with respect. Very few white men have been killed for their heads.

The country along the coast is subject to flooding. A river may rise and fall many feet. The combination of heavy rainfall, the backing up action of the tide, and the mountainous back country is responsible.

Mr. Dickson said he used to criticize the people for building their schools on hills.

The soil there is usually poor and the school garden is essential since many students are boarders. There is no place for a playground. Now he has changed his tune. The school building is often the only structure that survives flooding and thus serves as a temporary shelter following disaster.

Indonesia, consisting of Sumatra, Java, east Borneo and W New Guinea, is an unfriendly neighbor. They are engaged, with the help of Russia, in a tremendous military build up which they claim is for defence. Dickson doubts it.

Over 100 yrs. ago much of the larger animal life had already been destroyed by the intensive hunting of the Dayaks. Although the rhino is now protected it is a useless law because the rhino is probably extinct. There are still orangutans, crocodiles (dangerous), clouded cats. There are cobras, king cobras, fruit bats. Even birds

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have been hard hit by hunting.

Dickson used to collect butterflies, fossils and other natural history materials.

A frog chorus got underway about 9:00 p.m. and I heard it going strong every time I woke up. Now at 6:45 a.m., only an occasional frog is heard and the amphibian voices have been replaced by birds.

Two books on the Rajahs recommended by Dickson - Hahn, Emily, "The Rajahs of Sarawak" and Runciman, Steven, "The White Rajahs."

Feb. 11

Mr. Dickson arrived to take me to the St. Joseph's School (Roman Catholic), probably the best school in the country at the upper secondary level, Bro. Hillary in charge.

There are 650 secondary students and 850 primary. Soon the latter are going to another school. Form 6 is included and is attended by both boys and girls; the rest of the school caters to boys. I met John North, school inspector at the secondary level and Clive Neate who, with two other New Zealanders familiar with curriculum reform in New Zealand, are involved in syllabus revision at the junior secondary level (Form-1-3). These men have been brought in by the Department of Education & have been here over 2 yrs.

Feb. 11 The school system is just now making science compulsory in junior secondary, in the light of the New Zealand study. In Form 1 it has been compulsory for only 3 weeks (the new semester has just started). Bro. Hilborn said general science tends to relate to the local agriculture. To familiarize the teachers with the new science program they have had a six week workshop.

There are $3\frac{1}{4}$ million people in Sarawak; only 120 students go to Form 6. The Education Department is trying to introduce compulsory education in grades 1-6. There are more private than government secondary schools but 70% of the primary schools are governmental.

There are private schools aided by grants from the government but only schools that take students from the 30% passed group get such support. LCE questions on exams are prepared by the local educational authorities but the ACE exam. is prepared by Cambridge as is college entrance exam. following Form 6. The universities at Singapore and K.L. are willing to device these exams. for the higher levels but the local people prefer the Cambridge exam. Overseas status is much greater if student has covered the Cambridge material and has passed the exam.

If the local Dept. of Education were to request a change in the examination attention would be given the request and if a reasonable one the chances are ~~the~~ a change would occur. Indeed, Cambridge sends out people from time to time to see

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Feb. 11 if a change is needed. However, the desires of local people are not always met. Bro. Hillary said a request was put in for questions on the economic development of Sarawak. Instead the exam. called for an economic survey of Malaysia, a much more complicated problem. Questions are to appear in future exams. on Borneo, at request of local people to get off our emphasis on Malaya.

Neate then took me to the Saint Thomas' School near the hotel. As in the previous school, the science teachers are Indian. In the biology lab. I talked to P. V. Joy, a biologist, and P. R. Thampi, a chemist. The latter seemed to be the more knowledgeable of the two. The biology lab. was very poorly equipped. Virtually no preserved reference collection, few models, few work tables ~~and~~ but there were 5 standard microscopes. Mr. Joy emphasized the great handicap in the lack of equipment and that there were no botanical and zoological gardens nearby. I countered by suggesting that I had seen many insects, interesting local plants (the sensitive plant, for example) during my brief stay, and that these common organisms in the school yard might be used.

Feb. 11 Joy had little comment.

I noted that many of the students in the adjoining physics lab. were Chinese. It came out that because of a more erudite home background and emphasis on math in elementary school in the Chinese schools, that "selection" favors the Chinese $\frac{1}{2}$ of the students that reach Form 1 are said to be Chinese. The Malays tend to do better in the arts stream. Schools in the backcountry do little with science topics. Furthermore the ~~major~~ Malayan students come from poor homes. If there is a crop failure, a boy may have to drop out of form 6 to take a job to help his parents. If I found that Mr. Thampi was familiar with the CBA. He feels there is little point in taking time out for historical aspects in the physical sciences. It may even be confusing to some students. Once when he was presenting Dalton's atomic theory of ~~unsubstantiated~~ indivisible atoms, a student protested that atoms were divisible.

Mr. Joy appears to be a person who dispairs of teaching biology because of equipment shortages. Mr. Neate said he has continually hoped to see a few live animals in the lab but there is nothing. The Form 5 level now requires a habitat approach.

Thampi felt one way to up-grade science teaching would be to have workshops in a Singapore school that is using PSSC. Teachers could be sent for training.

The Colombo plan is doing a good

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Feb. 11 job in Sarawak. Some 22 countries are involved in Colombo, either as donor or recipient countries - Canada, Great Britain, ~~and the~~ U.S., Aus., New Zealand are among those involved. I believe it was started in 1950. Its primary aim has been economic aid to S + SE Asia and stress has been on hydroelectric development, fertilization of depleted lands, dam construction, etc. By 1955 it was realized the Communists could provide such things too and a small percentage of aid began to go to social developments, including education (about 5%). In response to Sarawak's request for educational aid, the Colombo Plan has provided 18 out of 37 Canadian graduate volunteers. In addition there are 10 Australians, 9 New Zealanders, 25 Peace Corps people. The latter are mostly concerned with community development and the 4H program. Eight Peace Corps people are in secondary school education. An English parallel is the Volunteer Service Overseas (VSO). These are high school graduates who came for 1 year before going to the University; or they are apprentices in British firms.

Feb. 11. Most economic aid required by Sarawak comes from the British Colonial Development ~~program~~ and Welfare Fund. This agency has poured in millions of pounds with no effort to get recognition.

The Colombo Plan also sends out local people on scholarships. The headquarters of the program is at Colombo, Ceylon. One can get brochures on exports from the U.S.A. and other donor nations. Most of the foregoing information came from Colin and Gloria Smith (address - c/o Education Dept., Kuching), Canadians who have been in the country nearly 3 years on the plan. They emphasize the fine cosmopolitan atmosphere that is developing from contacts among the great variety of people engaged in a common effort to elevate the lot of the common man.

After having lunch with the Smiths I photographed the leaf nest ants and saw them using their larvae to stitch together the leaves. Inside the nest was a seething mass of ants.

Stopped at the Education Department headquarters and said goodbye to Mr. Dickson and others. I learned from Neate that he has collected many plants and is quite an expert on the local flora. Saw a blow gun made from a single piece of wood. The hole is bored with a wood shaft tipped with metal.

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Feb. 11 and the wood chips are floated out. The gun is worked in a vertical position with a slight bend in it so that when the metal spear is attached and held in proper position, the bore will be straight. Sighting through it, the bore was as shiny and straight as a gun barrel. The spear tip is used to dispatch the paralyzed animal.

Neate said there are few birds around Kuching. They have been killed off for food. A fish *Talpia*? is cultured. The animal eats algae and will grow to a weight of a pound & a half in a year.

Neate took me to the Batei Lintang Training College directed by Father Rawlins, an Anglican. He has a BSC. Rawlins was a large rugged, gork natured man with heavy black eyebrows. He had a real appreciation for "Nature Next Door" and work with common plants & animals. He formerly was principal of a government school. This is the only Training college in Sarawak and it covers all grades but stresses elementary school training.

Feb. 11. I learned that about 2 years ago, when Neate came to Kuching, he started a Science Teachers Association of Sarawak (STAS). Thampi is currently president.

I got the names of the examinations followed in Sarawak. They are put out by the Univ. of Cambridge Local Exams. Syndicate. Syllabuses, Science Subjects 1961, General Certificate of Education (ordinary level) and School Certificate Exam (Form 4 & 5). The Secretary Syndicate ~~Blk~~ Buildings, Cambridge, U.K. One should also ask for the Higher School Certificate (Form 6).

I had tea at Neate's. While at his home I had a look at the carnivorous pitcher plant and I plucked a sample to take home. It is a climbing vine type. ~~Neate~~ Neate then drove me to the airport. One of his two sons came along. There were many military men present armed with side arms, Sten? guns and mobile artillery. There have been rumors of attacks on villages near the east Borneo border - Kuching, for example.

Flew out under a cloud ceiling. It has been raining for many weeks. Involving country with many muddy

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Kuching

Feb. 11 meandering streams. The Smiths said the clearing of the forest had augmented the flood problem.

About halfway across the South China sea the clouds began to break up and we came into Singapore with a magnificent view of the city with its lights twinkling and boat lights reflected in the harbor. The flight back was far less rough than the trip to Kuching.

To return to Father Hilary - he feels there ought to be more use of reptiles in biology studies in Sarawak because they are so handy & prevalent. He laments the prejudice that people have toward these animals.

The Teacher Training School is a magnificent modern structure, although I feel the architect got a little carried away. Neale said they spent so much money on the physical plant there, they had little left over for other schools.

Feb. 12 Stayed at a Chinese Hotel, The New Country Hotel, about 3 miles from the airport. Left at 7:30 a.m. A bird was singing in the garden as I left. The hotel manager called it a brown cuckoo. It sounded

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Feb. 12 a little like a mockingbird. I caught
a glimpse of a slender brown bird with buff
face. Perhaps it was the singer.

Left airport at 9:00 a.m. We will gain $\frac{1}{2}$ hr.
on trip to Hong Kong. Enroute we stop at Bangkok.
Many coconut groves around Singapore.
Cathay Pacific Jet Flight # 724. Beautiful new
plane.

9:20 a.m. Flying along coast over apple green
water stained brown opposite river mouths,
where silt pours out. Much wild growth,
here and there cut out for farms. Contour
planting of rubber trees (?) noted as around
K. L.

9:30 a.m. Over mountainous section grown
extensively to jungle. Tremendous uncut
wild area. The N-S mountainous ribs of
the central Peninsula are on the horizon to
the W. Scattered "cotton tuft" clouds below
us, a high thin cirrus above.

9:47 a.m. Leaving Malay coast for flight
across Bay of Siam. Water near shore
blue-green changing to corulean blue
further out. Extensive coastal ~~plain~~ ^{Hota Bharu?} plain
with patch work of farms. Cloud puffs in rows!

Altitude
~~Altitude~~ 36,000 feet, ground speed 600 mi.
per hr. Arrival time Bangkok, 10:20 a.m.
(time now in Bangkok 9:22 a.m.). 8 passengers
(24 seats) in 1st class.

Flight to Hong Kong at 37000 ft., 620 mi/
per hr.

Arrived Hong Kong about 2:30 p.m.
Came down through cloud layer but
good visibility below.

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Hong Kong

Feb. 12 Stayed in the Park Hotel Kowloon, a city built on a peninsula. To the N lie the New Territories and Communist China; to the S across a narrow straight ^(?) $\frac{1}{2}$ mi wide lies Hong Kong Island. My hotel window looked out over the channel and island. About 1 a.m. I looked out and the streets were wet. What looked like snow was falling past my window but I learned the next day from my tour guide that he had not seen snow in Hong Kong during his life time (some 35 yrs.).

Went with a Mr. + Mrs. James Hall (retired shoe merchant) on a tour of the New Territories. The driver was an affable young Chinese who spoke good English. He made many stops so we could take photographs. Highlights of the trip were as follows: The refugee area N of Kowloon where thousands of people live in block-like buildings 8-10 stories high. Very crowded with many clothes out to dry and people crowded in the market place. Small girls carrying babies on their backs.

The floating families in their small boats. The rice fields & vegetable gardens. People watering the gardens with piced sprinklers suspended from a shoulder carried

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Feb. 12. crossbar. Vegetable gardens growing on beach sand. Water is obtained from wells.

Men carrying pigs to market in baskets on the rear of bicycles. Water buffaloes but short horned, quite different from those seen in Bangkok. Fish culture ponds where the fish, the "black cat" is reared. It has a yellow oil in its head, according to "Blackie" our driver. The oil is steamed out for its vitamins. The flesh is also good. The fish feed on algae & cooked rice. The fish have black color on top its head, hence the name. Saw huts on stilts. Stopped at Yuen Long (Un Long), a small town, for photography. At Lok Ma Chau we stopped for a look at Communist China. A river with fence marks the dividing line. We could see the city of Shuen Chuen over the border. Boats come down the Pearl River for trade with Hong Kong. There is active trade going on between Communist China & the port city. Refugees are allowed into Hong Kong at the rate of 50 a day. Saw people digging out clumps of dark soil for transport to town where it is sold for fertilizer. Terraced rice fields.

In the afternoon to the afternoon I took the ferry to Hong Kong delayed and photographed Chinese women ~~working~~ mixing cement.

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Manilla, Philippines

Feb. 13

Left Hong Kong at 8:45 p.m., Thai jet flight # 702 to Manila. Arrived in Manila at 9:20 p.m. but did not get to my hotel until after 11:00 p.m. because airport bus was held up waiting for an international skating troop, "Holiday on ^{Ice} ~~Ice~~".

Feb. 14

At 8:30 a.m. Mr. Generoso J. Gil, Jr (pronounced "Gill"), of the program staff of the Asia Foundation (L. & S. Bldg., 1414 Dewey Blvd., Manila) arrived to inform me that my cable had been received and a schedule prepared. Mr. Judge, the representative, however, was getting married and I would be cared for by Gil.

We went first to the Philippine Normal College where I met a group of science instructors and the head of the Normal College Natural Science Dept. The school is a state college. The following persons present have requested copies of "guidelines": Mrs. Emilia S. Vito, Miss Rosa R. Lopez (Claro Recto High School, Sampaloc), Mrs. Esther S. Reyes (Philippine Normal College Laboratory School), Mrs. Asuncion G. Zapata, Mrs. Araceli M. Villamin, Dr. Soledad Samonte (Director, Laboratory School, Philippine Normal College), Mrs. Josefina A. Vicente (Head, Science Dept.), Dr. Dionisio

Feb. 14. ²³¹⁻²³² Garzon (Head Practical Arts Dept., Philippine Normal College), Miss Aquilina M. Obana, Mrs. Constanca P. Villahermos (sp.?).
Mr. Daniel S. Oreta, Mr. Juan Mantoya, Mrs. Virginia P. Blanco, Mrs. Aurora Villamil (sp.?), ^{Mr. Tomas P. Tadena,} Mr. Jose G. Cabrera, and Mr. Teofilo E. Espejo (all of the Natural Science Dept., Philippine Normal College).
All names listed not identified as to connection are people from the Normal College. I was given a summary of purposes of the college which is clipped, herewith.

The college was founded under the American regime but now, of course, is completely run by Philipinos. The school trains high school and elementary school teachers. A laboratory school is associated with it.

The group was very much interested in the guidelines material and thought it would be especially helpful in teacher training programs and as a guide to educational administrators.

I learned there was one Univ. of Philippines, a number of private colleges of education and a National Teacher's College. Highschool students can major in ~~the~~ biology, general science, physics, and chemistry, the latter two fields have been offered only recently.

In the elementary school about 30 min. a day is allotted for science in grades 1-4 and 40 min. in grades 5 & 6.

The students get general science. One teacher lamented the fact that science

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Feb. 14 was not integrated with social studies. She felt the latter arrangement would make the subject more meaningful. We are trying to get away from this now in the U.S.

In grades 1-2, the children study the national language. In grade ⁴ they get instruction in English. This began last June. The public elementary schools follow a prescribed curriculum thus the normal school must fall in line. Gardening is one of the requirements, thus every normal school student has 10 weeks of this. The gardening program has been going on since before the war.

I visited several classes in the laboratory school which is physically attached to the college. One class went into the garden and the teacher asked questions about why the water fell toward the earth when the faucet was turned on and why the water dripped when it was turned off. A comparison was asked for with respect to a water lily and papaya plant growing in the garden. One little girl demonstrated that a water lily had a soft body by going limp. In the garden were lettuce and pechay and a member of normal school

Feb. 14. ²³⁴ Students gardening.

There are some 4000 students in the normal school and some 1000 in the laboratory school. There are 8 regional normal schools. I met Dr. ~~Emiliano~~ Emiliano C. Ramirez, the president of the ~~school~~ Normal School and learned we would be leaving in the same plane for Honolulu.

We then went to the Philippine College of Arts and Trade where I met ~~Dr.~~ Mr. G. Data and saw several shops — a metal shop with about 15 ~~lathes~~ lathes (^{sp.}), a wood shop where the boys were doing inlay work with bamboo. Dark colored bamboo is made by soaking in mud to ~~cause growth of fungus~~ ^{of mildew} and then treated chemically to inhibit the growth ^{and insect attack}. I saw checkerboards, table tops, etc. done in inlay.

I met the Dean, ^{of instruction} Dr. Jose Vergara. Chemistry & physics in the school is applied in the laboratory part but theory is given in lecture. The Arts & Trade school is involved in teacher training.

Many of the students fill the gap between the skilled worker and the professional engineer. There is a great demand for students of this type. Some 18 technical courses are available.

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Feb. 14 The school handles 2500 students, 300 are preparing to teaching. The rest will go into industry. 1250 are on evening session. Bunting, welding, refrigeration, metal shop, foundry shop, mechanical drawing are courses taught. 5th & 6th grade students are available for practice teaching.

After this visit I had lunch with the science group & was given a valentine.

In the afternoon we went to Arellano Highschool to visit science classes. I met Miss Visitation Mendoza, Head of the Natural Science Dept. I saw stuffed birds, preserved specimens, models, etc., mostly prepared by the students. I was shown Sci Fair exhibits. The high schools are encouraged to have science fairs. There is a National Science Fair every 2 yrs.

Each school has a vocational department that helps with equipment and school construction.

The schools follow a syllabus developed by the department of education. In Manila the teachers have considerable leeway in the development of syllabus topics but

Feb. 14. ²³⁰ in the provinces they hold closely to the prescribed program. Examinations on syllabus material are conducted by the Dept. of Education.

I learned that at the University of the Philippines they were trying out the green version of BSCS and adapting it to the country by changing the examples. University biologists are helping with this. After this summer the plan is to try to get gradual adoption of the green version in the schools. Grobman came through about 3 months ago and gave advice on the selection of BSCS material. The green version seemed most suitable for the country.

Schools are crowded. One high school had at one time 11,000 students. It was bigger than Harvard. This was about 4 yrs. ago. Such large schools are now being broken up.

Visited shops at Arellano. Talked to one of the teachers who had had 10 months training abroad on the Colombo plan. He squipped his shop through the plan. The Philippine government has now allotted 1 million ~~pesos~~ dollars for such shop developments.

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Feb. 14 Visited Magsaysay Highschool, named after the former president of the Philippines who was killed in an air crash in 1956. Magsaysay was well-liked. He was devoted to the poor and opposed to Communism.

Construction was underway on a new wing. Some 52 schools in Manila are involved in building. Only in Manila is there free education, including free texts. This started this year and even includes free ~~snacks~~ snacks.

Visited a biology class that had been studying conservation. A skit was put on ~~by~~ by the students, entitled, "The day after the field trip." The students brought out the importance of conserving soil, water, wildlife, forests, etc.

The school is on 4 shifts - 6:50 ^{a.m.} to 10:20 p.m. Mrs. Imperatriz Cariso was in charge of the biology class (3rd yr.).

We visited the school museum. Saw collections of shells, mounted birds (in rather bad shape), models of clothing styles, etc. I was given shells to take to my daughters.

Mrs. Amparo Nazareth, head of the science department was in charge of the Museum.

Feb. 14²³⁸ A few odds & ends: There are decorated, large wheeled horse-drawn carriages here called "Calesas".

~~Native religion~~

The Philippines say they got their ~~native~~ religion from Spain, their education from the U.S., and a slap from Japan. One percent of the populace is Protestant, the rest is Catholic.

Saw a fat area that served as an internment camp during the war for American soldiers held by the Japanese. It is now occupied by the University Santo Tomas. The war set the country behind in science.

8:15 pm. Went to the Overseas Press Club on Dewey Blvd., a few doors from my Hotel (Filipinas Hotel). Mr. Gil picked me up. Met Dr. Benjamin B. Villasanta, Science Supervisor Division of City Schools - Manila, City Hall.

Villasanta said the city schools were democratic with respect to the teaching of science and that teachers were allowed considerable leeway to develop their material. Also present was Mr. Florencio Solivent chief, Division of Development and Assistance, Nat'l. Sci. Dev. Board (NSDB), I forgot to mention that in the late afternoon we visited a flower show at the Paco Cemetery. I was intrigued by the ~~are also for~~.

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Feb. 14 following Chinese proverb: "If you want to be happy for a few hours, drink wine until your head spins ^{is} gaily." If you want to be happy for a weekend get married and hide away. If you want to be happy for a week, kill a tender pig and eat it. If you want to be happy all your life long ... become a gardener." Secret of Happiness:

Dr. Jose Rizal, a Philippine martyr, killed by the Spanish is buried at Paco. The massive walls are shell-pitted from the last war. The Japanese held out there.

At the garden show I saw the fruit of the "Bunga" or beetle-nut palm which people chew as a narcotic. They mix lime with it and it is said the lime inhibits tooth decay and is chiefly responsible for the narcosis. The fruit is yellow and about the size of a small lemon.

Feb. 15 This morning I met with the group from the Bureau of Public Schools of the Department of Education. The following persons were present: Dr. Liceria B. Sariano, Supt. of Science Education; Dr. Emilio H. Severino, In charge, Special Subjects and Services Division; Mr. Tomas

Feb. 15²⁴⁰ Maglaya, Supt. of Secondary Education;
Mr. Aurelio Juele, Supervisor of Science Education;
Dr. Luz Sangalang, Supervisor of Science Education;
Mrs. Angeles Villavert, Supervisor of Science
Education; Mr. Julio Baroña, Science Teaching
Aid Specialist; Miss Carolina Perez (sp.?), Science
Curriculum Coordinator; ~~Mr.~~ Mr. Jose Cruz,
Secondary Education Supervisor; Miss Purita (sp.?)
Quinto, Math. Curriculum Coordinator; Mr.
Guillermo (sp.?) Cobanilla, Science Curriculum
Coordinator; Mrs. Pilar Cosico, Assist. Curriculum
Coordinator (math.). Later I met Dr. Dolores
Hernandez, Secretary, Graduate College of Education,
U.P., Chairman BSCS group.

I learned from the group that PSSC materials
have been examined by the summer science
institutes, as has CBA. CBA has been criticized
on the basis of being too difficult for both
teachers and students and requiring equipment
difficult to provide. Further solmest, however, full
objection on basis of equipment can be overcome by
showing critical experiments as demonstrations
or on film. Harvey White's "Continental Classroom"
series in physics is being shown throughout the
country, I believe under the auspices of NSF
of the Philippines. PSSC has also been criticized
as rather too difficult for the Philippines.

I stopped in briefly at the U.S. Embassy
to see Miss Carol Harford, Cultural Affairs
Officer. (Wm. H. Stevenson is Ambassador).
John Esterline is ^{head} of Foreign ~~and~~ Leader Program
of the Dept. of State, I believe. Miss Harford
suggested I contact the following persons:

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Feb. 15 Roman Toranzo, Superintendent of Schools, Manila; Julita Santos, Supervisor of Science Education, Secondary Schools, Manila; Father Kaligbak, Rector and President of Colegio de San Juan de Letran. The latter was sent recently to visit, study, discuss, and consult with people in the U.S. on Sci. Education, however, I discovered upon being shown his itinerary and list of contacts that he had evidently not been put in touch with the people involved in the new curriculum studies! Miss Harford, herself, seemed only vaguely aware of them.

At the Univ. of Philippines 10 teachers are finishing a year course on BSCS materials. Their summer ~~adp~~ adaptation of the green version will be completed. CBA and PSSC programs are regarded as a little difficult for Philippine teachers. Their background needs to be upgraded. CHEM, however, might work. The above 10 teachers are going to use the green version of BSCS in 10 highschools.

There are 249 general high-schools, 120 vocational schools and over 1000 private schools in the country. The Bureau people said one of the main problems is supplies, including manuals.

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Feb. 15. There is also the problem of lack of qualified teachers. The U. P. is now planning courses in science designed for teachers. A Convention and Conference of Scientists and Teachers had as a theme, "The Development of skills of creative thinking." ¶

Mrs. Luz Sangalang drove me to U.P., about 10 miles out of town to the Teacher Training School where I met Dean Morales. He has been stressing science in the training program, despite the fact that his background is in non-science areas. Mrs. Sangalang is an alumna. At the school we met Miss Dolores Hernandez, chairman of the BSCS group. It was obvious these two intelligent, energetic young women were enthusiastic about the BSCS prospects.

Ralph Wilson, a New Zealander in the Philippines on a Colombo-UNESCO grant, prepared a physics course for the high schools. (UNESCO 1960 Physics for Philippine Schools). A chemistry course is being developed in a summer writing session involving chemistry professors, teachers and educators working together.

Mrs. Sangalang said BSCS started a year ago last June. J. Dixon, president of ABIS advised on the program in the Philippines but he was killed in a plane crash recently.

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Feb. 15 It was through him that communication was set up with BSCS. Jane and Victor Larson are coming from the U.S. to help with the Philippine BSCS. The program has the support of the University of the Philippines — professors, materials, office help, professional collaboration of Bureau of Public Schools and teachers from the Bureau. Teachers are assigned to the project and supported by the Bureau. Dr. Dolores Hernandez is the project director.

The adaptation draft of the green version is to be out by the end of the summer and it is hoped to get the 10 teachers started with the new materials by July. The material will be taught for one year and Mrs. Sangalang and a teacher will evaluate. Over a thousand texts are to come from BSCS.

I learned that Japan was interested in the blue version.

The National Public Educational System in the Philippines is basically an elementary school system. 75% of the school population is to be found there. 60% drop out ~~at~~ and there is no further education.

Feb. 15. Last summer there was a writing session on elementary school science.

"Suggested Science Concepts and Experiences for Grades I-VI" by the Elementary Science Workshop, Summer, 1962. The Peace Corps has ~~been~~ started to use this material.

There is a UNESCO and Philippine Govt. program for training teachers from SE Asia. ~~There~~ Thirty people are involved, all in teacher education. All are senior people. The Asia Foundation is involved through its fellowship program.

Miss Hernandez was interested in my fly cage and I promised to send her a copy of the plan for the cage. Her address is Graduate College of Education, Univ. of Philippines.

A source of laboratory equipment in Manila is the Salesian (SDB) Fathers - the Society of Don Bosco. They specialize in running technical schools. One institute is producing lab. equipment.

At 5:00 pm. left for Honolulu on PAA flight #818. 45 min. stop at Guam. Arrived at Honolulu at 10:35 a.m. John Hendrickson picked me up at the airport and I spent the afternoon at his home. That evening I attended a meeting of Club 15" and their program entitled "East Meets West in Hawaii".

Philippine Normal College
NATURAL SCIENCE DEPARTMENT

The Science Department has about twenty faculty members and one laboratory assistant. Classes in science runs to about seventy-five or more sections per semester. These include the undergraduate day, evening, and Saturday classes.

The increasing number of science classes have made existing facilities even more inadequate. There are only three laboratory rooms used by the Physics, Biology, Chemistry and Physical Science classes. Most of the laboratory equipment were procured by the college. Some have been donated by the UNESCO. New equipment and apparatus were recently received from ICA (AID) - NEC Program.

The following are the objectives in teaching the basic sciences in the four-year curriculum:

1. To help carry out the fifth general objectives of education promulgated by the National Board of Education:
"To promote the science, arts and letters for the enrichment of life and the recognition of the dignity of the individual."
2. To endeavor to attain the major objectives of science education through varied activities in and out of the classroom. These major objectives are:
 - a. To develop a functional understanding of facts, concepts, and principles of science.
 - b. To develop the ability to use the scientific method.
 - c. To develop basic skills, appreciations, and further interests in science.
 - d. To develop desirable social attitudes.
3. To encourage leadership, group dynamics, as well as individual efforts and ingenuity.
4. To encourage and guide the students in the proper use of the different scientific equipment and apparatus available in the department.
5. To develop the creative and scientific abilities of students in the construction and use of inexpensive equipment (made out of local materials) in science teaching.

Beginning the year 1962-1963^a, new science curriculum has been implemented which increases the requirement from fifteen to seventeen units in basic science courses. Three of these units are in College Mathematics. Another course in Basic Mathematics is required of students although they do not earn credit for it. The science subjects are:

NATURAL SCIENCE DEPT. (Cont'd.)

Science 101 - Physical Sciences - 3 units
Science 202 - Biology - 3 units
Science 203 - Earth Science (Physical Geography) - 3 units
Science 304 - Science for the Elem. School Teacher - 3 units
Science 305 - Physics - 3 units

All the courses above meet four days a week; one or two hours are devoted to laboratory work.

Besides these seventeen units which are required of students working for the BSSE, there is offered additional Science Courses of 19 units leading to a Certificate for Teaching Elementary Science. Actually, if a student completes the basic requirements of seventeen units and the 6 units required in Health, he needs only an additional of 12 units to earn his certificate.

A student may take these units as their electives. However, there are only 6 units for electives.

The PNC Graduate School offers a Master of Arts degree with specialization in science.

Since the summer of 1958, the Natural Science department has been conducting Summer Science Institutes in collaboration with the National Science Development Board and the Bureau of Public Schools

To promote more science consciousness among students the Science Department has encouraged the organization of the Natural Science Club. The club promotes such projects as:

1. Science quiz programs
2. Annual science exhibits of locally-made equipment
3. Science club library

Following are other activities and Projects:

1. Science Museum and other exhibits. The department has been developing a science museum. Simple equipment made of native materials are exhibited as well as for use. Teachers from all over the country have visited our museum. This museum eventually might expand to become a Science Center.
2. Extension Service - Besides the Saturday classes, faculty members have been invited in the field to help as resource persons, demonstrators, consultants, speakers, etc. in upgrading science teaching.
3. Participation in national and international conferences and organizations. Several faculty members have been encouraged to attend science conferences and conventions sponsored by:

NATURAL SCIENCE DEP'T. (Cont'd.)

- a. Biennial Convention of the Philippine Association of Science Teachers
 - b. National Conference on the Science Curriculum
 - c. Biennial conference of UNESCO
 - d. Conference on Basic Science of South and East Asian countries - UNESCO
 - e. NSDB Evaluation conference on Summer Institutes
 - f. Childhood Education, International
4. Textbook writing. Faculty members have been encouraged to write textbooks, source books, and manuals in science, and outlines in science
5. A science travelling library - This is a project that might be pushed through this year in collaboration with the Council for Elementary Science International, United States and Asia Foundation.

Submitted by:

(SGD.) JOSEFINA A. VICENTE
Head, Science Dep't.

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Philippine Normal College
Manila

Miss Rosa R. Lopez
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Mrs. Esther S. Reyes
Phil. Normal College
Laboratory School
Manila

Mrs. Asuncion G. Zapata
Phil. Normal College
Manila

Mrs. Araceli M. Villamin
Philippine Normal College
Manila

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Honolulu

Feb. 15 This was the biggest collection of VIPs since Washington. Professor Kennedy G. Trigonning was the speaker. He talked on "The Problems of Malaysia". Hordickson was in disagreement with him on a number of points. After the talk we saw an Indonesian shadow show.

John said there were some 14 species of Draco in the jungle near Kuala Lumpur. The largest is Draco maximus, about 12" long. Baby Draco can't fly. They must be about 2" + long before they can do so. The females can easily be caught when they come to the ground to lay. They lay in the soil at the base of trees and deposit 2 eggs (as I recall). Draco occurs in the southern Philippines.

Feb. 16 Left for San Francisco on PAA flight #844 at 10:00 a.m. Arrived at 4:50 p.m. Scattered clouds, recent rain, everything green. Met Mr. Larry Canning, U.C. Berkeley Assistant Business Manager on the plane.

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1963

Feb. 27 Lord Medway visited at Berkeley. He allowed me to copy a tape he made on Temiar songs. The Temiar people are Malay aborigines. Che Malu b. Along, Medway's aboriginal servant, whom I photographed, is a member of this tribe. The music should perhaps be called preinstrumental. Segments of bamboo, varying in length and diameter and closed at one end are struck against a log. The node or closed end is brought against the log as the segment is held vertically. The musician holds a segment in each hand and strikes them against the log alternately. Two people may play in a somewhat syncopated rhythm. Pitch can be regulated by the length of the segments. They are shortened until the desired note is achieved. ~~One~~ The ~~single~~ "instruments", then, are of percussion type.

Medway says the singers recorded are singing a rather trivial song - "Good bye, we hope you'll come again", etc. A hissing sound heard occasionally is done with parted lips and slightly parted teeth. The women may echo phrases sung by the men.

Feb. 27

He said the people of Malaya have many taboos. After menstruation women can eat no red meat and go without it for their entire lives. Their only animal protein comes from occasional fish. They are almost strictly vegetarian. They tend to have ^a~~bad skin~~, pot belly, and sallow skin. The men, however, who eat meat, and hunt ~~it~~ regularly with blow guns, are in fine condition. The situation is different in Sarawak, however. There the women look in good condition.

The Malaya aborigines are still essentially in the Neolithic stage. The only iron they have is in the machete. Bamboo is the primary tool & structure making material.

Medway said the rhino has been virtually eliminated in the last 50 yrs. with the introduction of the shot gun. Primitive hunters did not damage the population significantly even though the Chinese have been after these animals since before Christ. All parts of the animal are valued as a tonic or stimulant. The flesh is much too valuable to be eaten. It is dried and made into medicine. Urine, feces, gall bladder, blood, horn, hide, etc. are used.

Stebbins, R.
1963

Feb. 27 A rhino brings about \$10,000 U.S., enough to set up an aboriginal for life. Hunters follow an injured animal doggedly, shooting it repeatedly until it dies.

Shot guns have virtually eliminated the horn bills in Borneo and most of the larger birds and mammals. Smaller things still persist, however. Over 76% of Borneo is still virgin growth and nearly the same percentage pertains in Malaya, although there, rubber planting, etc. is rapidly making inroads.

Lizards

Stebbins, R.
1963

Draco volans

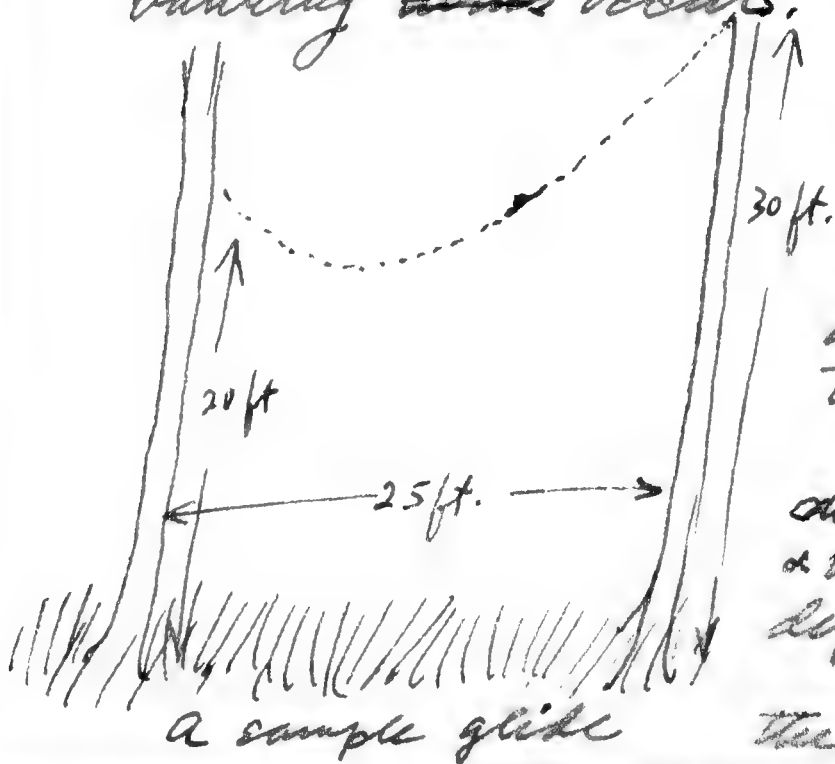
Kapar Rd., 4½ mi. NW Klang, Selangor, Malaya
Feb. 9 Arrived at 11:00 a.m., overcast weather.

The habitat here is a grove of coconut palms, ranging in height from 20 to 60 ft., mixed with nipah palms and tall grass (to 3-4 ft. high) in ^{the} uncultivated portions. A number of native dwellings (on stilts) were present. The Draco were in a section where the palms were especially numerous and close together, thus providing easy gliding distances. We saw a total of 4 or 5 individuals. They tended to remain above about 20 ft. on the taller palms, always headed upward. The general grayish tone of their bodies blended with the gray bark. One was seen within about 12 ft. of the ground where a palm frond from a nearby tree touched the trunk where the lizard perched. When an improvised bamboo mooring pole was brought near, the lizards climbed upward and often to the opposite side of the trunk. However, they did not move when the pole was used to try to knock them to the ground, even when it came within 3 or 4 inches. The chunky rounded head with protruding eyes is held high and the bright lemon yellow dewlap is occasionally flicked forward when this lizard is alarmed. It is supported by a slender spike of cartilage (3)



along its anterior border. The elevated head position is necessary to permit free movement of the dewlap.

We attempted to make the lizards take to the air by pounding on the tree trunks but this technique failed. On two occasions throwing rocks at them caused them to take flight and the approach of a native boy up the tree trunk also ~~caused~~ caused flight. Once one was seen to spread its wings out flat against the tree trunk but it retracted them without taking flight. Flights here were nearly in a straight line from one tree trunk to another. On one occasion the route was through the fronds of a low-growing palm and I thought for a moment the lizard was going to land in the palm canopy but it continued on through, missing a frond by inches to alight on a trunk. Most flights were 15-20 ft. in length but one was over 30 ft. The wings were stationary throughout and the hindlegs were held about as shown in the sketch. The curve of the wing presents an airfoil section. The flight was quick, yet slow enough so that one had a clear image throughout. Only once did a lizard bank slightly but Wells said in dense forest, sharp banking ~~turns~~ occurs. He also said the time to collect is on bright days in the morning and during the breeding season when the lizards chase each other up and down the tree trunks.



The sudden exposure & disappearance of the blackish & brown wings creates a definite flash-color effect. I took movie shots of the lizards on tree trunks.

Stebbins, R.
1963

Draco

Kapar Rd., 4½ mi. NW Klang, Selangor, Malaya

Feb. 9 but was unable to get one in flight.

Finally despairing of noosing them we resorted to the use of sling shots. After firing perhaps 75 times I hit one, damaging its head and popping out one eye. The lizard fell directly downward, with one wing extended, almost on me as I stood in tall grass at the base of the tree. The animal had been at a height of about 40 ft. The time was around 4:00 p.m. and it was getting so overcast that it was difficult to get pictures even with Kodachrome II. Shortly afterward it began to rain.

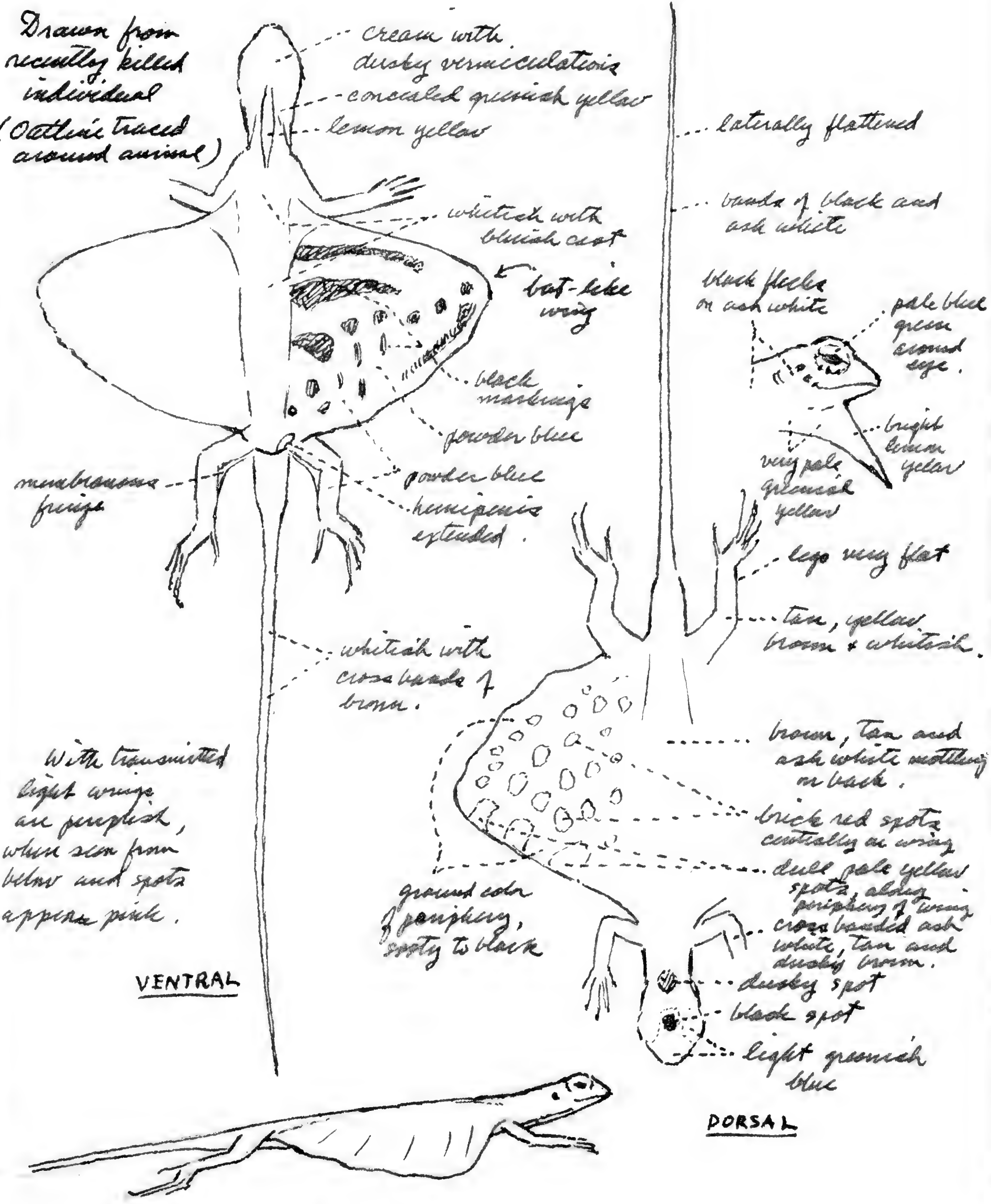
The wings fold down along the sides, the largest pteroin just overlapping the base of the hind legs.

Stebbins, R.
1963

Draco
(Color Notes)

Feb. 9 Kapar Rd., 4 1/2 mi. NW Klang, Selangor, Malaya

Drawn from
recently killed
individual
(Outline traced
around animal)



cream with
dusky vermiculations
concealed greenish yellow
lemon yellow
whitish with
bluish cast
bat-like
wing
black
markings
powder blue
powder blue
hemipenis
extended
membranous
fringe

laterally flattened
bands of black and
ash white
black flecks
on ash white
pale blue
green
crossed
eye
bright
lemon
yellow
very pale
greenish
yellow
legs very flat
tan, yellow,
brown & whitish.

With transmitted
light wings
are purplish,
when seen from
below and spots
appear pink.

whitish with
cross bands of
brown.

ground color
of periphery,
sooty to black

brown, tan and
ash white mottling
on back.
brick red spots
centrally on wing
dull pale yellow
spots, along
periphery of wing
cross banded ash
white, tan and
dusky brown.
dusky spot
black spot
light greenish
blue

VENTRAL

DORSAL

Nat. size. (81)

